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THE 1985 AMA REPORT ON INFORMATION CENTERS

AMACOM BRIEFINGS & SURVEYS

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1.

HIGHLIGHTS AND CONCLUSIONS

Information Centers are brand new. A third of them started up last year, another 30 per cent in 1983. As many will form in 1985 as did in '84. Today, 40 per cent of all businesses have them, 80 per cent of billion-dollar companies.

Information Center managers have an important voice in purchasing decisions. **Half of them must approve all hardware purchases for their worksites; 40 per cent must sign software requisitions.** Those who okayed purchases in 1984 averaged over **$900,000** in mainframe technology approvals, and better than **$100,000** in microcomputer hardware and software.

As InfoCenter managers **set standards at corporate headquarters,** where more than half such Centers exist, their decisions have a significant ripple effect on hardware and software choices in divisional and subsidiary locales. Setting such standards is their job; two out of three InfoCenters are in the business of evaluating microcomputer hardware for their companies, and **four out of five evaluate micro software.**

These managers are supporting, not fighting, the concept of end-user computing. They are encouraging end-users to lay hands on computer technology, helping them justify expenditures, and training them by every available method. By supporting end-users, they are keeping the mythic "computer revolution" under control.

Companies with InfoCenters are acquiring micro, mini and mainframe technology at ever-increasing rates, but **InfoCenter managers are leaning toward mini and mainframe solutions** and justifying the decision in terms of cost, data security, and ease of access.

However, Information Centers are by no means entirely successful at their jobs. By their own account, InfoCenter managers **haven't improved training procedures nor lessened DP backlog** at their worksites to a significant degree. They do feel successful at making computer hardware and software more cost-effective, and are proud of increasing end-user productivity.

INTRODUCTION

There is no such thing as a personal computer. Any computer may be put to personal use, or to business use; a computer's size does not make it "personal" any more than an airplane's size determines whether one flies for business or personal reasons. The question is not one of size, but of use.

In an organization, the central questions about computers have to do with who gets to use them, at what time, and to what purpose; who may store information, and who may retrieve it. When there was one computer -- and that a vast machine, intricate and mysterious -- these questions were simpler to answer. Only a professional could put the technology to use, and computer time was allotted to the various departments as deemed appropriate.

Brilliant technological advances increased the amount of information computers could store, the speed at which they worked, and the ease with which they could be operated; a greater number of people could have simultaneous access to the computer's memory and dexterity.

These same advances made computers less expensive. It was price that made computers "personal"; the phrase is a marketing term, not a technological one. (The technical term for a small, self-contained unit is microcomputer.) In the market, a "personal" computer is one that a significant number of individuals can afford.

In practice, however, a "personal" computer is one operated by the person who uses the data it generates -- the "end-user" of the data. If an individual sets the computer's priorities, selects its software, and allocates its time, the computer is "personal." In this study, "personal" computing and "end-user" computing are interchangeable terms.

The motivating factor in end-user computing, in almost every instance, was the difficult relationship that existed between those who required data for reports, forecasts, budgets -- any of a thousand reasons -- and the data processing division. While "DP backlog" assumed almost legendary proportions, beyond it lay an even larger communications gap. Those asking for data in various configurations simply did not understand the technical

implications of their requests, and many data processing professionals lacked the communications skills necessary to explain the problem. Instead, when faced with an end-user's requisition, their response might be, "Well, it'll take a few months to work out a program." Why so long? The answer was clouded with techno-babble.

Small wonder that a manager would eagerly lay hands on a "personal" computer. Small wonder, too, that personal computer advertising would dramatize just such a situation: one manager helpless to complete a report without the aid of a DP professional; his colleague free to leave for the sports arena, having done his report on his own desktop machine.

Of course, it was not that simple: not the hardware, not the software, not the links by which corporate data might be fed into personal computers for specific study. That discovery compounded the end-user's problem; on top of his confusion came the embarrassment of asking the DP professional for help -- often to be told that things could not be helped. The personal computer and the corporate mainframe were "incompatible"; they spoke different "languages"; the mainframe "software" demanded a certain configuration of data which was wholly different from the requirements of the desktop machine . . . more techno-babble.

The confused end-user might find solace in knowing that Management Information Service (MIS) and Data Processing (DP) professionals were sharing similar confusion. Every breakthough that increased computer capacity and capability -- and it seemed that each passing week brought such a breakthrough -- posed new and difficult questions of hardware strategy. Mainframes, minis and micros; smart terminals and dumb ones; standalone systems, local area networks, distributed facilities -- oh, for the days of the pencil, the pad, and the file cabinet! Now, add the cry for "personal" computers -- some truly necessary, some occasionally useful, some mere desktop decorations or executive "perks" -- and the difficulty of managing information technology grows as swiftly and as relentlessly as the technology itself.

End-user computing promised freedom from the constraints of shared time, shared machines, and shared processes. Yet it created as many problems as it solved. For if centralized data processing imposed constraints, it made possible the essential elements of management: planning, organizing, and controlling. Without these elements, how could information technology be managed?

One answer was to be found in a new functional unit, staffed with technological trainers and data processing professionals, and charged with assisting end-users in computer applications. While such a unit may go by various names, an emerging consensus calls it the **Information Center.**

The development of this new functional unit is somewhat difficult to trace. Some existed -- and still exist -- informally; the "office expert" whose opinion is eagerly solicited by computer neophytes is an "Information Center" of one. Some go by names such as "End User Assistance Program;" some are outgrowths of training courses and never received separate designation; some are extensions of in-house computer hotlines. "I came here to find out how to start an Information Center," said a registrant at the first Information Center Conference and Exposition in Boston in August 1984, "and I found out that we already have one." At the same time, the name "Information Center" may designate an entirely different operation. If you call the New York headquarters of Exxon, an early leader in end-user computing, and ask for the "Information Center," you will be connected with the corporate library.

By whatever name, the Information Center has a mission: putting computer technology directly into hands of people who are not data processing professionals. With such a mission, every aspect of information technology might fall within its venue.

Given all that it might do -- computer training, tests and evaluations of hardware and software, approvals of data transfers from mainframes to micros -- an InfoCenter's actual mission depends on such diverse factors as:

- o The corporate environment -- the company's size, business function, and degree of centralization.
- o The technological environment -- the style of information technology the company had in place before an InfoCenter was created.
- o The planning environment -- the process of research and consultation that led to an Information Center.
- o The training environment -- the method and manner of instruction in computer usage offered to non-data processing professionals.

The purpose of the research effort for the 1985 AMA Report on Information Centers was to discover what manner of companies have such units; what these units do; how they are staffed; what costs are incurred when they are formed; and what benefits are realized from their operation. We also sought data on end-user computing in companies without such units, to make useful comparisons in the environments listed above, and to study how the costs of end-user computing are being managed.

EXECUTIVE SUMMARY

Like end-user computing itself, Information Centers are new. Three-quarters of the desktop computers in business arrived in the past two years; nearly two-thirds of existing Information Centers began operations in the same short period. The technology and the steps to control it are keeping pace, and the notion that microcomputers are "out of control" savors more of myth than fact.

There is an apparent "critical mass" of microcomputers which triggers the formation of an InfoCenter or similar unit. Four out of five of our respondents with such Centers -- 70 per cent of our large company respondents -- had Information Centers in place before there were more than 10 personal computers at the worksite. Of our total of 343 respondents, only 17 -- 4.9 per cent -- reported more than 25 microcomputers on site before an Information Center came on line to assist and train in their use.

In the summer of 1984, a computer courseware company estimated that 1,400 InfoCenters existed; at the same time the editors of a new magazine aimed at this market stated that 9,000 were in operation. The units are simply too new and exist in too many guises under too many names to get a firm handle on their total number; even 9,000 is a low estimate. Of 343 respondents to AMA's major questionnaire, 158 (46.1 per cent) have units fitting our working definition of "discrete functional units charged with assisting end-users in computer applications." Of those that lacked InfoCenters, a third of the large companies and a quarter of the mid-sized firms will organize one in 1985. A 1984 membership poll of the Data Processing Management Association revealed that 60 per cent of their member's organizations would have such units by the end of the year. More than half the respondents to AMA's "short" questionnaire said their organizations had "centralized personal computing assistance functions in an Information Center or similar unit;" an additional 10 per cent reported plans to do so in 1985.

Large companies have Information Centers in greater proportion than mid-sized or small companies. Nearly three-quarters of our respondents with annual sales in excess of $500 million have them, as do well over half our "mid-sized" respondents (annual sales between $50 million and $500 million); but fewer than a quarter of our respondents with sales below $50 million do. A third of our large company "Non-IC" respondents will implement an Information Center this year, but only 14 per cent of small company respondents have such plans.

Banking and financial institutions, insurance companies, utilities, manufacturing concerns, and diversified conglomorates have InfoCenters in far greater proportion than wholesale or retail traders, educational establishments, or construction firms. Half the InfoCenters we surveyed existed at a corporate headquarters, only a fourth at companies with all major units under one roof (this reflects the large company/small company ratio mentioned above). Highly or moderately decentralized companies are more likely to have IC's than centralized organizations.

At start-up, these units are expected to standardize microcomputer hardware and software, evaluate new products and assist end-users in selection and training, and supervise linkages between microcomputers and mainframe computers. The motivating factor behind this mission is to lessen the data processing backlog and to ameliorate hostility between DP and end-users.

For most organizations we surveyed, starting an Information Center did not require extraordinary expenditures. Fewer than one in five purchased new mainframe hardware or even increased the capacity of the existing mainframe. A third added mainframe terminals at start-up, at an average cost below $50,000. The most common start-up expenditure was for "courtesy" microcomputers; 43 per cent of InfoCenter respondents made such purchases. But more than one-fourth of all InfoCenters reported no hardware expenditures of any type charged to start-up.

The creation of an Information Center frequently signalled a change in the worksite's basic approach to computer technology -- that is, a change in "hardware strategy." Almost half our respondents with InfoCenters -- 46.2 per cent -- allowed microcomputers no part in their strategies before the Center came on line. (Conversely, a tiny number - four, or 2.5 per cent of IC respondents -- threw out standalone micro's already in place when the Center began.)

The addition of an Information Center expanded the range of hardware strategies available to end-users. Half our respondents added "standalone microcomputers" and "microcomputers linked to mainframe" to their options. Few dropped strategies; of those that did, "in-house timesharing of remote computer services" was most likely to go. One in seven IC respondents dropped timesharing when the InfoCenter started operations.

The charts on hardware strategies pursued, added and dropped at start-up, which follow in Chapter 4 of this report, give evidence that Information Center implementation was part of a larger reorganization of MIS/DP functions in respondent organizations. Conclusions drawn from such statistics should read in this context. InfoCenter start-up is by no means the only factor at work when companies deal with end-user computing or information technology as a whole.

Although training proved to be the outstanding function these new units performed, computer professionals, not trainers, were put in charge. The typical Information Center manager was selected from the organization's MIS/DP operation. Unless the company was small, he/she was not a senior manager; more likely the position was slotted at the middle or supervisory management level. The staff supervised typically consisted of two data processors; on the average, small companies have since added another processor, large companies two new staffers.

The clientele served by this staff is evenly divided among middle managers (27.9 per cent), supervisors (25.8 per cent) and exempt, non-supervisory personnel (24.8 per cent). Senior managers make requests less frequently (12.0 per cent), and non-exempts less frequently still (8.9 per cent). By department, one in four end-user requests comes from finance, one in seven from corporate, sales, or administrative personnel, and only one in twenty from human resources.

What requests do these end-users make? They ask for help in selecting hardware and software; they want to download data from the corporate mainframe; they want to bring data from on-line databases to their screens. But primarily they want training: more than half the InfoCenters surveyed reported training as their most frequently requested service in 1984. The **single** most requested service was for training in the use of spreadsheet software. To the question, "What do InfoCenters do?", the most statistically accurate answer is, "They train middle managers to use spreadsheets."

Computer training has increased dramatically in all areas in the past two years, whether or not companies have introduced Information Centers or charged them with coordinating hardware and software training. But the presence of an InfoCenter is an indication of a greater use of in-house trainers, and a lesser use of vendor-supplied materials or off-site training programs, with a concommitant savings in training expenses.

InfoCenter respondents also realize savings in hardware and software purchases. Most InfoCenters must be consulted on such expenditures; half must approve of microcomputer hardware purchases, and insist that the hardware be compatible with the mainframe. An Information Center's authority in lower-ticket software purchases is less complete, but two out of five IC's must sign on to any software purchase made.

Information Center managers surveyed for this report used that authority to purchase over four million dollars worth of new mainframe computers in 1984, and **thirteen** million dollars in microcomputer hardware. This year they will sign on for more than 6,000 new microcomputers and 7,500 new mainframe terminals. Additional thousands will be spent to upgrade present hardware.

The benefits gained from Information Centers derive from their assigned duties and authorities. Four out of five Centers cite "increased end-user productivity" among their most important accomplishments; three out of five so rate "increased standardization of microcomputer hardware." Half rate "increased compatibility between microcomputers and mainframe" highly, along with increased cost-effectiveness of both hardware and software.

But Information Centers are no cure-all for the Great Data Processing Logjam of the Eighties. While half of all Centers cited the DP backlog as a most significant factor in starting an IC, only 27.8 per cent -- and only 16.9 per cent of large company respondents -- rate "lessened DP backlog" among the significant benefits realized from the InfoCenter operation.

And InfoCenters have not solved the training problem either. For all the training that they perform and recommend, fewer than half of them rate "better training procedures" among the most important benefits Information Centers produce.

The whys and wherefores of this gap between expectation and reality will be a continuing theme in the material that follows. Information Centers do many of the jobs set out for them. They make people more productive and technology more cost-effective. Certainly they strive to lessen the DP backlog, and attempt to do so with a variety of training methods. But problems remain.

4.

TO HAVE AND HAVE NOT: ORGANIZATIONS WITH INFORMATION CENTERS

All over corporate America, goes the myth, microcomputers are at their silent work -- hundreds and thousands of them, smuggled into office buildings in various guises ("Funny, it doesn't look like carpeting!"), creating nightmares, threatening security, marring designs for integrated, compatible systems.

Myths may teach a truth, but they generally overstate facts. There has been a wave of new computer technology in the past two years, but it is less a tidal wave than good surfer's curl. That is to say, the wave can be managed. It is being managed, in companies and at worksites that deal most closely with numbers, by computer specialists who assist users of data to develop that data themselves, on either mainframe computer terminals, microcomputers linked to the mainframe, or standalone micro's.

Half of our respondents with such units -- 81 of 158, or 51.3 per cent -- call them **Information Centers.** Half use names such as "End User Assistance Program," "Computer Support Services," "Interactive Computing," or "Personal Computing Systems."

By any name, they are formed and go into service before the microcomputer wave inundates the workplace. The runaway computer myth is undone by this statistical fact: very few companies allow microcomputers at the workplace willy-nilly. Table 1 below shows how few.

NON-INFOCENTER WORKSITES (Sample: 178)		Total Resp. #	Total Resp. Pct.	Annual Sales: Below $50M #	Below $50M Pct.	$50M - $500M #	$50M - $500M Pct.	Above $500M #	Above $500M Pct.
Microcomputers at worksite - 1984	0	16	9.0	13	11.6	2	4.8	1	4.2
	1-10	120	67.4	86	76.8	24	57.1	10	41.7
	11-25	25	14.0	8	7.1	12	28.6	5	20.8
	Over 25	17	9.6	5	4.5	4	9.5	8	33.3

Table 1. Microcomputers at Non-InfoCenter Worksites

There appears to be a "critical mass" at work: when more than 10 microcomputers arrive at a worksite, a special unit will likely be formed to evaluate them, assist in their selection, and train in their use. And if such a unit is likely at 10 micro's, it is fairly certain when they top 25. This can be seen in Table 2, which shows the number of microcomputers at the worksite when an Information Center was formed.

INFOCENTER WORKSITES (Sample: 147)		Total IC's		Annual Sales: Below $50M		Annual Sales: $50M - $500M		Annual Sales: Above $500M	
		#	Pct.	#	Pct.	#	Pct.	#	Pct.
Microcomputers at worksite	0	18	12.2	6	18.2	8	14.5	4	6.8
	1-10	94	63.9	23	69.7	32	58.2	39	66.1
	11-25	19	12.9	4	12.1	6	10.9	9	15.3
	26-50	11	7.5	0	0.0	7	12.7	4	6.8
	Over 50	5	3.4	0	0.0	2	3.6	3	5.1

Table 2. Microcomputers at Information Center Worksites at Start-up
(By Annual Sales/Budget)

Three-quarters of our InfoCenter respondents had units in operation before the number of microcomputers at the worksite topped 10, and nine out of ten Information Centers were on line before the number of micro's exceeded 25. **We found almost no evidence of "runaway computer" situations, regardless of whether our respondents had Information Centers at work.**

Nor is this care to control the microcomputer a new phenomenon. Although two-thirds of our respondent InfoCenters are less than three years old, the more mature centers were on line when micro's reached the "critical mass" at their worksites.

INFOCENTER WORKSITES (Sample: 148)		Total IC's		Year of Start-Up: Pre-1983		1983-84	
		#	Pct.	#	Pct.	#	Pct.
Microcomputers at worksite	0	15	12.0	11	21.6	4	4.1
	1-10	98	64.6	34	66.7	64	66.0
	11-25	21	13.3	5	9.8	16	16.4
	26-50	10	7.0	1	2.0	9	9.3
	Over 50	4	3.2	0	0.0	4	4.1

Table 3. Microcomputers at Information Center Worksites at Start-up
(By InfoCenter Maturity)

Even in the past two years of the great microcomputer gold rush, seven out of ten companies forming Information Centers had the units on line before more than 10 micro's were at the worksite.

Before we entirely bury the runaway computer myth, however, we should remind ourselves that 10 microcomputers in a worksite population of 500 or fewer can have enormous impact, and 25 such machines may make a revolution. But such a presence, revealing as it would the potential of end-user computing, creates the "critical mass" which calls a coordinating unit -- the Information Center -- into being.

The InfoCenter is more a concept than a location, and it often exists in practice before it is officially recognized. The title itself may be overly grand for many facilities. Information Center implies a large number of people at work at the very heart of the corporate computer operation, and this misstates the frequent reality of small or part-time InfoCenter staffs, or of employees who function as in-house computer experts without official designation.

A reputation for such microcomputer expertise is a mixed blessing, the Wall Street Journal reported in November 1984. "The payoffs don't always seem equal to the costs," Journal reporter David Stipp wrote. "Besides the demands on their time, unofficial personal computer experts often find themselves locking horns with data-processing departments that feel threatened by the personal computer invasion. Further complications arise when unofficial experts become coordinators for personal computer use without the authority or time to do the job well.

"The unofficial computer guru is likely to be a continuing phenomenon in most offices . . . [They] are usually more accessible than outside trainers. They are also more likely than outsiders to be familiar with the kinds of problems their colleagues are trying to solve with personal computers."

The problems may diminish if the "unofficial guru" is officially recognized. The **"official** guru," holding the middle ground between computer professional and computer neophyte, can facilitate understanding in both camps. Familiar if not fluent in computer jargon, the guru can translate the end-user's problems into language the professional can address, and can explain to the frustrated end-user that it takes time and trouble to put a personal computer to work on a corporate problem. To bridge the DP/end-user gap is a primary mission of an Information Center; it is an obvious (but by no means inevitable) step to recognize officially the "guru's" role.

An InfoCenter may have an informal beginning: for instance, an end-user project to create a program independent of MIS/DP overseers. Such a case was reported in the September 24, 1984, issue of Information Systems News. In

two instances, departmental end-users at Delmarva Power & Light Company of Wilmington, Delaware, developed their own programs in consultation with the company's Information Systems Department. Vendor-trained in fourth-generation software, the end-users in the Personnel Department created a personnel management system, while colleagues devised a fleet management system on a mini-computer independent of the corporate mainframe. In acting as a consultant, the single ISD systems analyst on the project performed the definitional InfoCenter role of putting computer power into the hands of end-users.

End-user computing will continue at Delmarva P&L, according to general manager Duane C. Taylor: "Users can decide themselves to modify and enhance a system. They don't have to get on an ISD waiting list with other departments' projects . . . (In) five years, 50 per cent of the programming will be done by users. It's not company policy yet, but the first two projects were successful. There's enthusiasm for it. And, besides, it helped reduce the number of people in ISD and has given users an air of independence."

The Corporate Environment

As a public utility, Delmarva stands in a group our survey found most likely to have an Information Center. Every one of the utility companies responding to our major questionnaire had an InfoCenter; so did three-quarters of the diversified conglomorates and governmental bodies, two-thirds of the insurance companies, and more than half the banking and finance institutions and manufacturing concerns. But only a third of the wholesale or retail traders, a quarter of the construction companies, and a mere sixth of those in professional services had such units. Table 4, on the following page, lists our respondents -- those with InfoCenters and those without -- by economic activity. While examining Table 4, it may be helpful to keep in mind the mission of the Information Center: to assist those using computer-made data to do their own computing. There are more "end-users" among bankers and financiers today than among retailers; InfoCenters exist where end-user populations are large enough to support them.

Of the 185 major questionnaire respondents lacking Information Centers, 35, or 18.9 per cent, report plans to centralize their end-user assistance functions in 1985. This group includes 14.2 per cent of our small company/non-IC respondents, 28.6 per cent of our mid-sized non-IC companies, and 33.3 per cent of our large non-IC companies. Respondents to AMA's "short" questionnaire included a larger percentage of InfoCenter shops: 503 of 951 respondents, or 52.9 per cent, hail from companies with operating Information Centers, and an additional 95 (10.0 per cent) will start one in 1985. As previously stated, although InfoCenters are usually new and often somewhat difficult to identify as discrete units, most research efforts find that 45-55 per cent of organizations surveyed have a centralized end-user assistance function.

ALL RESPONDENTS (Sample: 343) Description of organization	Total Resp.	Have IC	Pct. Having IC's	Pct. of All IC Respond'ts
Utilities	10	10	100.0	6.3
Diversified conglomorate	9	7	77.7	4.4
Government/Military	9	7	77.7	4.4
Insurance	42	28	66.7	17.7
Transportation/Distribution	8	5	62.5	3.2
Manufacturing: Consumer Goods	21	12	57.1	7.6
Manufacturing: Industrial Goods	56	30	53.6	19.0
Banking/Finance	39	20	51.3	12.7
Mineral Extraction/Processing	6	3	50.0	1.9
Education	7	3	42.9	1.9
Communications/Publishing	8	3	37.5	1.9
Health Care/Medical	9	3	33.3	1.9
Trade (Wholesale/Retail)	26	8	30.8	5.1
Construction	4	1	25.0	0.6
Food Processing/Agribusiness	5	1	20.0	0.6
Professional Services	58	10	17.2	6.3
Entertainment/Recreation/Lodging	1	0	0.0	0.0
Other	30	12	40.0	7.6
Don't know/no answer	1	0	0.0	0.0
TOTAL:	343	158	46.1	100.0

Table 4. Percentage of Respondents with Information Centers (By Economic Activity)

Logic would point to the Information Center as a tool for decentralization. Its very reason for being is to take a centralized function -- data processing -- out of the hands of a single department and disburse it throughout an organization. Table 5 gives a solid indication that InfoCenters are more likely to be found in decentralized organizations.

ALL RESPONDENTS (Sample: 343) Self-described as:	Total	IC	%	Non-IC	%
Highly or moderately centralized	259	108	41.7	151	58.3
Highly or moderately decentralized	82	49	59.8	33	40.2
Don't know/no answer	2	1	50.0	1	50.0

Table 5. Centralized/Decentralized Respondent Organizations

Information Centers occur where the data crunch is most acute, where numbers are the food and computers the implements of the trade. Thus a corporate headquarters is a more likely IC location than a plant floor. Half of our IC managers described their worksite as a corporate headquarters for a multi-unit organization, as shown in Table 6 below.

INFOCENTER RESPONDENTS Worksite description	Total	Pct.
Corporate headquarters for a geographically dispersed, muiti-unit organization	80	50.6
Division/subsidiary/branch of a larger organization	39	24.7
All major units (except sales & service centers) in one location	39	24.7

Table 6. Information Center Worksite Descriptions

The single most important determinant, however, is company size. Information Centers are large-company solutions to end-user computing; large-company respondents were three times as likely as small ones to have such units, and half again as likely as mid-sized companies. Tables 7a and 7b show this to be the case whether company size is determined by annual sales (or budget) or by the number of people employed.

ALL RESPONDENTS (Sample: 343) Annual sales (or budget)	Total	Have ICs	Pct.
Less than $50 million	145	33	22.8
Between $50 million and $500 million	97	55	56.7
More than $500 million	83	59	71.1
No answer	18	11	61.1

Table 7a. Percentage of Respondents with Information Centers (By Annual Sales/Budget)

ALL RESPONDENTS (Sample: 343) People Employed (all sites)	Total	Have ICs	Pct.
Fewer than 500	142	31	23.2
Between 500 and 5,000	123	71	57.7
More than 5,000	75	55	66.7
Don't know/no answer	3	1	33.3

Table 7b. Percentage of Respondents with Information Centers (By Number of People Employed)

An organization's financial performance is not a meaningful indicator of an Information Center. In the three categories listed in Table 8 below, those organizations showing a **decrease** have the highest percentage of InfoCenter shops. If there is a problem in end-user computing, money will be found to deal with it; moreover, as will be shown, InfoCenter start-up is not a particularly expensive proposition. Companies losing money may well have a greater motivation to control microcomputer purchases that their more prosperous counterparts.

ALL RESPONDENTS (Sample: 343) Five Years (Since 1980)	Total	Ave. +/-	Have IC's	Ave. +/-	Non-IC's	Ave. +/-
Revenue increased	255	+15.7%	115	+15.7%	140	+15.7%
Revenue unchanged	36	--	12	--	24	--
Revenue decreased	16	-17.2%	12	13.6%	4	26.3%
No answer	36	--	19	--	17	--

Table 8. Respondents' Financial Performance Since 1980

Many InfoCenter practitioners agree that the Information Center concept originated with IBM's Canadian operation in 1977. IBM's corporate public relations office cannot confirm this, nor can it locate any IBM personnel who may have been present at the creation. No matter; given IBM's position and reputation in information technology, it cannot escape credit, due or undue. Only eight of our 158 InfoCenter respondents began their operations prior to 1979; only a third of them (51, or 32.2 per cent) were on line through 1982. Then came the rush: 46 start-ups in 1983, and 51 in 1984. We have seen above that large companies are more likely to have Information Centers than small or mid-sized ones, but the behemoths moved no more swiftly -- were slower, in fact, than small companies -- to establish such Centers. Table 9 below shows how recent a phenomenon InfoCenters truly are. In this and in all such examinations of Information Center age to follow, we use January 1983 as the cut-off date between "new" and "mature" Centers.

INFOCENTER RESPONDENTS (Sample: 158) Annual Sales (or budget)	Formed IC Prior to '83	%	Formed IC in '83 or '84	%	Date Not Given	%
Less than $50 million	16	48.5	15	45.5	2	6.0
Between $50 million & $500 million	14	25.5	35	63.6	6	10.9
More than $500 million	17	28.8	40	67.8	2	3.4
Annual sales not given	4	36.4	7	63.6	0	0.0
TOTAL	51	32.2	97	61.3	10	6.3

Table 9. Percentage of InfoCenters formed prior to 1983

The question, then, of "Who has Information Centers?" is answered in terms of the corporate environment. These units are most likely to be found at the corporate headquarters of large, fairly decentralized companies such as diversified conglomorates, banking, and financial and insurance concerns, and manufacturers of both industrial and consumer goods. Most of these organizations have implemented their Information Centers in the recent past. As the size of the organization diminishes, so also does the likelihood of an Information Center; but it is the common nature of smaller companies to be less structured, and the "unofficial guru" often plays the role larger organizations assign to an Information Center.

The Technological Environment

Corporate size is itself a determinant of the various "hardware strategies" an organization may pursue. As we shall see, larger companies are more likely to follow certain strategies, and a wider range of strategies, than smaller ones. Also, the advance of computer technology has afforded to all an ever-widening range of choices; Information Centers which began operations in 1983 or 1984 had a greater number of strategies to coordinate than did more mature Centers.

Our main questionnaire listed six distinct hardware strategies. They are by no means mutually exclusive; while half of our InfoCenter respondents pursued no more than one strategy at start-up, many had two or three at work, and a handful reported four or more. The choices were:

(1) In-house timesharing/remote computer services. The pre-'83 standard. When computers were larger and more expensive than they are today, timesharing made sense to most organizations: small companies shared time with one another, large companies split time among divisions, and a central coordinating unit regulated the flow. It was out of these timesharing operations that many Information Centers emerged.

(2) Distributed facilities: mainframe workstations. One worksite, one computer; access to the corporate database within security guidelines. It takes no particular expertise to display information on a screen, but to reconfigure the data -- "massage" it, say the professionals -- requires programming skills which are beyond the scope of most end-users.

(3) Distributed facilities: microcomputers linked to mainframe. As will be seen, this is the strategy InfoCenters are born to implement. In theory at least, it allows end-user access to the

most current corporate data, then permits the end-user to "massage" that data for his/her own purposes. If it were as simple as it sounds, most Information Centers wouldn't exist.

(4) Distributed facilities: dumb terminals linked to a mini-computer, linked in turn to mainframe. An alternative to (2) and (3), which in some configurations can turn "dumb" terminals -- those for display only -- into "smart" ones -- those capable of massaging data. It is a theory with strong advocates, and it is gaining currency.

(5) Local facilities: standalone systems serving a particular function/group. The precursor to local area networks (LANs), this strategy simply dedicates a complete system to the exclusive use of one or another department. Problems begin when one department wants, or needs, another's data for its own use.

(6) Independent facilities: standalone microcomputers. Basically, this is no more than a pocket calculator all grown up. The theory is the same: everyone has a personal tool with which to make calculations; each enters the necessary data, presses a button and gets the desired answer. But "entering the necessary data" on a pocket calculator takes seconds; even the smallest "personal computer" can hold thousands upon thousands of bits of information in its memory, and its proper use requires hours, perhaps days and weeks, of data entry. A microcomputer that cannot "interface" -- accept data -- from a corporate mainframe is often a waste of time, money, and desktop space.

Our main questionnaire also allowed space for "Other" strategies, but only 11, or 7 per cent, of our IC respondents and 10, or 5.4 per cent, of our non-IC respondents gave "others." In the main, the alternatives listed above cover the range of hardware strategies available today.

Our "short" questionnaire, distributed to end-users themselves rather than Information Center personnel or MIS/DP managers, offered four alternative strategies. Again, they were not mutually exclusive, and as will be shown, many respondents have access to more than one computing tool. The range of choices were:

(1) Standalone (unlinked) personal computer. Identical to the "independent facility" strategy listed above."

2. Personal computer with dial-up connections to other computer(s). A micro with a modem; a step towards a more integrated system, but in practice, more often than not, a telephone with a video display.

3. Personal computer directly linked to central mainframe or minicomputer. The concommitant to hardware strategy (3) above.

4. Computer terminal linked to central mainframe or minicomputer. Any strategy that does not involve microcomputers; within this category fall most of the hardware strategy alternatives listed in our main questionnaire.

We looked at "hardware strategy" data in a number of ways. We counted what strategies were operative at InfoCenter worksites prior to IC implementation; was there a strategic "critical mass" to match the numerical "critical mass" for microcomputers? We checked what strategies were added and/or dropped when the Information Center was implemented, by both company size and year of implementation. Finally we examined what strategies are followed at non-IC worksites, to see if the presence of an Information Center makes a readable difference in the approach organizations take towards computer technology.

Table 10 shows what hardware strategies were operative at InfoCenter worksites prior to the IC's implementation.

INFOCENTER WORKSITES (Sample: 158) Hardware Strategies	Total IC's		Annual Sales Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
In-house timesharing/ remote computer services	72	45.6	10	30.3	26	47.2	32	54.2
Mainframe workstations	76	48.1	5	15.2	28	50.9	39	66.1
Micro's linked to mainframe	5	3.2	2	6.1	2	3.6	1	1.7
Dumb terminals linked to mini, linked in turn to mainframe	24	15.2	2	6.1	10	18.2	12	20.3
Stand-alone systems serving a particular function/group	42	26.6	13	39.4	11	20.0	16	27.1
Standalone pc's	41	25.9	8	24.2	17	30.9	14	23.7
Other	11	7.0	5	15.2	3	5.5	3	5.1

Table 10. Operative Hardware Strategies Prior to InfoCenter Start-Up (By Annual Sales/Budget)

The economics of computer technology determined the most obvious differential by company size: larger companies were more likely to have their own dedicated mainframes on site, or to participate in timesharing operations -- in short, more likely to use computer technology altogether. Larger companies also followed a wider range of strategies. The mean was 1.4 different strategies for small companies, 1.8 for mid-sized, and 2.0 for large concerns; this again is a question of what one can afford.

In more recent times the affordability of microcomputers was forcing their use upon companies of every size. This is demonstrated in Table 11 below. Of IC's formed prior to 1983, only 9.8 per cent already had standalone microcomputers among their operative strategies; this figure leaps to 35.1 per cent among InfoCenters born in the past two years. Another readable trend was away from timesharing and towards dedicated mainframes on premises. and our figures confirm the obvious, that microcomputers were taking off in 1983 and '84.

INFOCENTER RESPONDENTS (Sample: 158) Hardware Strategies	Total IC's #	Pct.	Year of Start-Up Pre-1983 #	Pct.	1983-84 #	Pct.
In-house timesharing/ remote computer services	72	45.6	30	58.8	40	41.2
Mainframe workstations	76	48.1	19	37.3	52	53.6
Micro's linked to mainframe	5	3.2	4	7.8	1	1.0
Dumb terminals linked to mini, linked in turn to mainframe	24	15.2	6	11.7	17	17.5
Stand-alone systems serving a particular function/group	42	26.6	12	23.5	27	27.8
Standalone pc's	41	25.9	5	9.8	34	35.1
Other	11	7.0	4	7.8	7	7.2
Don't know/no answer	2	1.3	0	0.0	2	2.1

Table 11. Operative Hardware Strategies Prior to InfoCenter Start-Up (By Year of Implementation)

The same trend is visible in Table 12 on the following page. Prior to 1983, two-thirds of our InfoCenter respondents followed a single hardware strategy -- generally mainframe workstations. In '83 and after, more than half were following two or more strategies; standalone pc's accounted for most of the difference.

INFOCENTER WORKSITES (Sample: 158) Total Hardware Strategies	Total IC's #	Pct.	Year of Start-Up Pre-1983 #	Pct.	1983-84 #	Pct.
0	2	1.3	0	0.0	2	2.1
1	89	56.3	34	66.7	47	48.4
2	33	20.9	9	17.6	23	23.7
3	23	14.6	6	11.8	16	16.5
4	9	5.7	1	1.9	8	8.2
5	1	0.6	0	0.0	1	1.0
6	1	0.6	1	1.9	0	0.0
7	0	0.0	0	0.0	0	0.0
MEAN:	1.72		1.57		1.84	

Table 12. Number of Operative Hardware Strategies at InfoCenter Start-Up (By Year of Implementation)

The implementation of an Information Center was, in three-quarters of our studied cases, the signal for adding additional strategies, and those added strategies — no surprise — usually involved microcomputers. Tables 13a and 13b show this to be the case in terms of both company size and year of implementaton.

INFOCENTER RESPONDENTS (Sample: 158) Hardware Strategies Added	Total IC's #	Pct.	Annual Sales Below $50M #	Pct.	$50M - $500M #	Pct.	Above $500M #	Pct.
In-house timesharing/ remote computer services	16	10.1	3	9.1	4	7.3	6	10.2
Mainframe workstations	28	17.7	7	21.2	98	16.4	10	16.9
Micro's linked to mainframe	77	48.7	10	30.3	23	41.8	35	59.3
Dumb terminals linked to mini, linked in turn to mainframe	14	8.9	3	9.1	4	7.3	5	8.5
Standalone systems serving a particular function/group	39	24.7	11	33.3	11	20.0	14	23.7
Standalone pc's	73	46.2	12	36.4	24	43.6	30	50.8
Other	4	2.5	3	9.1	1	1.8	0	0.0
No strategies added	37	23.4	7	21.2	17	30.9	13	22.0

Table 13a. Hardware Strategies Added at InfoCenter Start-Up (By Annual Sales/Budget)

INFOCENTER RESPONDENTS (Sample: 158) Hardware Strategies Added	Total IC's #	Pct.	Year of Start-Up Pre-1983 #	Pct.	1983-84 #	Pct.
In-house timesharing/ remote computer services	16	10.1	8	15.7	8	8.2
Mainframe workstations	28	17.7	13	25.4	15	15.5
Micro's linked to mainframe	77	48.7	19	37.3	54	55.7
Dumb terminals linked to mini, linked in turn to mainframe	14	8.9	5	9.8	9	9.3
Standalone systems serving a particular function/group	39	24.7	13	25.5	26	26.8
Standalone pc's	73	46.2	19	37.3	53	54.6
Other	4	2.5	1	2.0	2	20.6
No strategies added	37	23.4	12	23.5	19	19.6

Table 13b. Hardware Strategies Added at InfoCenter Start-Up (by Year of Implementation)

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CASE STUDY: ADDED STRATEGIES

The Pennsylvania headquarters of a billion-dollar conglomorate opened its doors to four new hardware strategies in 1983, but guarded those doors -- and managed its quarter-million dollar hardware investment -- with an Information Center.

Prior to 1983, the headquarters, with a population below 500, followed a strategy of in-house timesharing of a remote computer. That strategy was dropped, and a variety of new approaches put in place, when the Information Center was inaugurated.

The company spent $185,000 on a new minicomputer to use as a mid-station for a distributed facility. "Dumb" terminals were linked to the mini, which was in turn linked to a mainframe. By far a majority of the headquarters' 150 end-users went to work on this system.

Microcomputers were introduced at the same time, and three strategies adopted for their use. Some, including $60,000 worth of "courtesy" pc's for the InfoCenter, were linked directly to the mainframe. Others were set aside to serve Human Resources and Office Systems as local facilities. Still others remained unlinked to any outside source.

Though the strategies were varied, every aspect of computer operations was managed by the Information Center: authorizations of purchases and linkages; evaluations of hardware and software and training in their use; creating software for special applications.

Small wonder that the MIS Director rates "increased end-user productivity" highest among the benefits realized from the Information Center. With a selection of alternatives available from a centralized control point, every end-user can be "plugged into the system" in a manner best suited to individual needs.

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The fact that the implementation of an Information Center dramatically increases the range of hardware strategies operative at a worksite is confirmed by Table 14:

INFOCENTER RESPONDENTS (Sample: 158) Total Hardware Strategies	Total IC's #	Pct.	Year of Start-Up: Pre-1983 #	Pct.	1983-84 #	Pct.
0	37	23.4	12	23.5	19	19.6
1	41	25.9	16	31.4	23	23.7
2	43	27.2	9	17.6	32	33.0
3	26	16.5	12	23.5	14	14.4
4	9	5.7	2	3.9	7	7.2
5	2	1.3	0	0.0	2	2.1
6	0	0.0	0	0.0	0	0.0
7	0	0.0	0	0.0	0	0.0
Mean:	1.59		1.53		1.72	

Table 14. Number of Hardware Strategies Added at InfoCenter Start-Up (By Year of Implementation)

Conversely, few companies reduced their range of hardware strategies at InfoCenter start-up; if they did, it was in-house timesharing which was dropped. No other important trends of "dropped" strategies emerge from Tables 15a and 15b on the following page. A hardy four organizations -- none of them large companies -- outlawed standalone microcomputers at IC start-up; all four simply linked the micro's to a mainframe.

INFOCENTER RESPONDENTS (Sample: 158) Hardware Strategies Dropped	Total IC's #	Pct.	Annual Sales: Below $50M #	Pct.	$50M - $500M #	Pct.	Above $500M #	Pct.
In-house timesharing/ remote computer services	25	15.8	8	24.2	9	16.4	7	11.9
Mainframe workstations	3	1.9	1	3.0	1	1.8	1	1.7
Micro's linked to mainframe	0	0.0	0	0.0	0	0.0	0	0.0
Dumb terminals linked to mini, linked in turn to mainframe	1	0.6	0	0.0	1	1.8	0	0.0
Standalone systems serving a particular function/group	3	1.9	1	3.0	1	1.8	1	1.7
Standalone pc's	4	2.5	2	6.1	2	3.6	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0
No strategies dropped	126	79.7	23	69.7	42	76.4	51	86.4

Table 15a. Hardware Strategies Dropped at InfoCenter Start-Up
(By Annual Sales/Budget)

INFOCENTER RESPONDENTS (Sample: 158) Hardware Strategies Dropped	Total IC's #	Pct.	Year of Start-Up: Pre-1983 #	Pct.	1983-84 #	Pct.
In-house timesharing/ remote computer services	25	15.8	9	17.6	15	8.2
Mainframe workstations	3	1.9	1	2.0	2	2.1
Micro's linked to mainframe	0	0.0	0	0.0	0	0.0
Dumb terminals linked to mini, linked in turn to mainframe	1	0.6	0	0.0	1	2.0
Standalone systems serving a particular function/group	3	1.9	1	2.0	2	2.1
Standalone pc's	4	2.5	1	2.0	3	3.1
Other	0	0.0	0	0.0	0	0.0
No strategies dropped	126	79.7	39	76.5	78	80.4

Table 15b. Hardware Strategies Dropped at InfoCenter Start-Up
(By Year of Implementation)

Finally, we compare the technological environment of Information Center worksites with that of non-InfoCenter worksites, in Table 16 below.

ALL RESPONDENTS (Sample: 343) Operative Hardware Strategies	Total Respondents #	Pct.	Have IC's #	Pct.	Non-IC #	Pct.
In-house timesharing/ remote computer services	112	32.7	63	39.9	49	26.5
Mainframe workstations	171	49.9	101	63.9	70	37.8
Micro's linked to mainframe	135	39.4	83	52.5	52	28.1
Dumb terminals linked to mini, linked in turn to mainframe	72	21.0	37	23.4	35	18.9
Standalone systems serving a particular function/group	149	43.4	78	43.4	71	38.4
Standalone pc's	224	65.3	110	69.6	114	61.6
Other	25	7.3	15	9.5	10	5.4
Don't know/no answer	3	0.9	0	0.0	3	1.6

Table 16. Respondents' Operative Hardware Strategies

We find that InfoCenter worksites are more likely to follow any given strategy than non-IC organizations -- another indication that the advent of an Information Center signals a widening range of computer hardware. We find InfoCenter shops nearly twice as likely to be linking microcomputers to mainframes, and far more likely to have any sort of mainframe technology available to end-users.

There should be no "chicken and egg" confusion as to what came first, the Information Center or the expanded range of available technologies. The Information Center was put in place to deal with existing technologies and to prepare for new ones. The unit did not cause the range of technologies to expand; computer research and development did that. InfoCenters allowed end-users to take advantage of these new options; organizations without end-user assistance programs are less able, and less quick, to take similar advantage.

Company size makes no important difference. Even among the largest organizations we surveyed, the presence of an InfoCenter is an indication of far wider use of both mainframe and microcomputer technology. This is demonstrated in Table 17 on the following page.

LARGE COMPANY RESPONDENTS (Sample: 83) Operative Hardware Strategies	Total Respondents #	Pct.	Have IC's #	Pct.	Non-IC #	Pct.
In-house timesharing/ remote computer services	40	48.2	31	52.5	9	37.5
Mainframe workstations	60	72.3	48	81.4	12	50.0
Micro's linked to mainframe	47	56.6	36	61.0	11	45.8
Dumb terminals linked to mini, linked in turn to mainframe	26	31.3	17	28.8	9	37.5
Standalone systems serving a particular function/group	39	47.0	29	49.2	10	41.7
Standalone pc's	60	72.3	44	74.6	16	66.7
Other	3	3.6	3	5.1	0	0.0
Don't know/no answer	0	0.0	0	0.0	0	0.0

Table 17. Large Company Respondents' Operative Hardware Strategies

With the singular exception of the terminal/mini/mainframe approach (of all listed strategies, this is the newest and the one with the most interesting potential) we again see that large companies with Information Centers are more likely to pursue any particular hardware strategy than their brethren lacking InfoCenters. This is especially true in using mainframe workstations.

Overall, our InfoCenter respondents reported that one in five of their on-site microcomputers were linked to the mainframe, a statistic matching the national benchmark figure of 20 per cent. Twelve per cent of our respondents reported that more than half of their micro's were linked, and a very few went as high as 80 or 90 per cent. Yet a trend can be discerned towards mainframe terminals at the expense of microcomputers. Respondent InfoCenter managers will increase their purchases of both mainframe terminals and micro's in 1985, but the increase will be greater in mainframes. This again reflects interest in the terminal/mini/mainframe strategy.

Where Information Centers are present, the ever-widening variety of computer hardware is effectively placed in the hands of those who require it. This process lags in organizations which have no end-user assistance programs. Most instructively, this holds true in companies of whatever size. Controlling and assisting end-user computing is not a result of available financial resources, but follows from a decision to manage those resources in support of end-users.

The Planning Environment

Simply put, companies with Information Centers may be divided into those that saw personal computing on the horizon and planned for it, and those that failed to see it coming and have been trying ever since to bring it under control.

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EXXON PLANS AHEAD; BEAR STERNS PLAYS CATCH-UP

"We decided several years ago that we were going to manage end-user computing. That doesn't mean [managing] what each individual end-user develops on his micro-computer, but we're going to manage what technology is used. We're going to manage whether or not they're put in willy-nilly, or whether they're cost-justified first. Those kinds of issues. And we're going to manage the type of support, and hopefully the kinds of generalized software, not every application, but at least the generalized software. That's really the role we're playing.

"Two years ago this decision was made, and there were hardly any [personal computers on premises]."

Barron Cashdollar
Client Support Center
Exxon Corporation

"There were a fair number of pc's out there, and they said, 'Let's do something,' so we were behind the eight-ball from the start."

R. Kip Lewis
System Analyst
Bear, Sterns & Company

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The planning process that precedes the implementation of an Information Center is important to its staffing, its mission, and its success. Nearly half of our InfoCenter respondents -- 74 of 158, or 46.8 per cent -- report that a formal needs analysis was performed prior to the Center's implementation. Most frequently these analyses involved surveys of and interviews with senior and middle management in the corporate, MIS/DP, and finance divisions; those firms, most of them large, which have Office Systems and Office Automation functions brought these departments into the process. Eight IC respondents were thorough enough to include non-exempt personnel among those interviewed.

Table 18 below shows the range and frequency of departments surveyed by those InfoCenter respondents who performed a needs analysis.

RESPONDENTS PERFORMING NEEDS ANALYSIS (Sample: 74) Department Surveyed	Total (74)		Annual Sales: Below $50M (19)		Annual Sales: $50M - $500M (26)		Annual Sales: Above $500M (24)	
	#	Pct.*	#	Pct.	#	Pct.*	#	Pct.*
Corporate	59	79.7	17	51.5	19	34.5	18	75.0
MIS/DP	59	79.7	12	63.1	23	88.5	20	83.3
Finance	49	66.2	12	63.1	16	61.5	17	70.8
Sales	25	33.8	6	31.6	10	38.4	8	33.3
Human Resources	25	33.8	4	21.1	11	42.3	9	37.5
Administration	39	52.7	10	52.6	15	57.7	5	20.8
Purchasing	17	23.0	5	26.3	6	23.0	4	16.7

*Includes five respondents that did not give figures for annual sales.

Table 18. Departments Surveyed in Needs Analysis Prior to Start-Up

A leading West Coast bank conducted an extensive needs analysis which, however thorough, centered on three simple questions:

- Who's doing what with the data?
- What do they need in order to do their own computing?
- What products do we want to support in order to answer those needs?

The "who's doing what" question prompted interviews with end-users in the decision support system, the management information system, the development department and the marketing division. These study participants displayed degrees of computer literacy ranging from professional expertise to "computer naivete."

The "what do they need?" component targeted specifics on an individual basis: who needed access to corporate data? An integrated system of inquiry and analysis? Applications software that would permit them to massage the data without having to learn advanced computer programming?

This led in turn to the question of what products to support. Where necessary software did not exist in the vendor catalogs, application specialists created it -- and did so in advance of end-user requests.

The pace of technological advance makes it difficult to plan an Information Center. So does the language barrier: computer professionals and end-users do not readily understand one another's needs and capabilities.

There is no exact answer to the first problem. The most difficult decision to make is the moment at which to jump in and deal with the technology as it exists at that moment, knowing that it will soon be surpassed in memory, speed, and economy. But one cannot wait forever.

As for the communications problem: the best moment to deal with it is at the outset. Table 18 above shows that fewer than half of our respondent InfoCenters did a thorough needs analysis, and of that number, only a third consulted personnel in sales or human resources. Fewer still solicited input from the purchasing department. If the data processing department is to communicate with end-users through an Information Center or similar unit, communication must begin at the outset. The wider the level of involvement, the better the chances of success.

The Training Environment

Information Centers are first and foremost training resources. Currently, training is an InfoCenter's foremost task: at start-up, 70 per cent of them were assigned the task of training in the use of microcomputers, and 65 per cent, training in the use of microcomputer software. More than half report "training" as their most frequently requested service. Whether or not they were originally intended as training centers, the fact is that Information Centers **train** -- and they are not doing a particularly good job of it.

Fewer than half of our Information Center respondents list "Better training procedures" among the most significant benefits realized from their operation. They are, after all, new units, and they are casting about for the best methods to fulfill their mission; thus the extraordinary range of different training methods employed. They are performing this experimentation in the face of the most extraordinary claims from a huge number of eager vendors, and with the most insistent urgings from an anxious end-user clientele. And those claims and urgings are being made upon InfoCenter staffs which consist primarily of data processors, with little or no experience in training.

One factor especially complicates efforts to gather and interpret statistics on computer training. There has been a huge increase in the amount of training, and in the demand for effective training techniques, over the past 30 months. We will find, in the charts to follow, that **all** InfoCenter respondents make more use of a wider variety of training methods than they did before the Center came on line; and in using such a range of methods they mirror the activity at non-IC shops.

Our major questionnaire sought information on nine different types of training in both hardware and software, and while the data is massive, it is not contradictory, and some patterns may be discerned that relate directly to the presence of an Information Center.

Let us first look at the most basic of facts concerning computer training: its dramatic increase. Table 19 below compares the use of various methods of hardware and software training prior to InfoCenter implementation and as they are used today.

INFOCENTER RESPONDENTS (Sample: 158) Training Methods Used	Hardware				Software			
	Pre-IC		1984		Pre-IC		1984	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Self-instruction by end-users	74	46.8	125	79.1	84	53.2	131	82.9
Instruction by in-house trainers	57	36.1	121	77.8	68	43.0	133	84.2
Vendor manuals or cassettes	48	30.4	108	68.3	73	46.2	118	74.6
Vendor-operated on-site training	24	15.2	43	27.3	37	23.4	54	34.2
Vendor-operated off-site training	35	22.2	56	35.4	48	30.4	64	40.5
Independently produced manuals or cassettes	11	7.0	54	34.2	19	12.0	72	45.5
Independent on-site training	8	5.1	42	26.6	17	10.8	52	33.0
Independent off-site training	8	5.1	36	22.8	10	6.3	49	31.0
Computer-based training programs	11	7.0	65	42.4	17	10.9	88	55.7
None/No answer	18	11.4	0	0.0	11	7.0	0	0.0

Table 19. Hardware and Software Training Methods Employed by InfoCenters

Every category shows an increase -- some merely(!) double, some six-fold (e.g., computer based training). The figures for software training do not differ importantly in any category from those for hardware training. And the number of **different** training techniques employed shows a similar expansion: InfoCenter respondents employed an average of 1.9 different hardware training methods prior to start-up, but used an average of 4.1 different methods in 1984; in software the average was 2.5 different techniques prior to start-up, 4.8 in 1984.

The pattern is similar to what we found in hardware strategies: the implementation of an Information Center immediately increases the range of available training methods for both hardware and software. Among the reasons:

- o There are so many people to train. This small window in time, the middle-1980's, finds newly available technology in demand by the great population bulge in American society, the post-World War II baby boomers. They will soon represent a majority of

middle and supervisory managers (the largest element among end-users, our research shows); they did not (as their children will) learn to use a computer in school. The combination makes for an extraordinary demand at a time when supply is short.

- There are so many choices available. Within each of the categories listed in Table 19 above there exist subsets to complicate matters even more, and to demand a fair chance. Vendor-operated training programs? There are dozens of hardware vendors, hundreds of software vendors, offering such programs. Independently operated programs? The number increases yet again. Computer based training? Using a computer to teach about computers seems perfectly logical. The choices grow harder, not easier.

- Experimentation is allowed. Again we remind the reader that most of these units are less than two years old; a third of them went on line in 1984. Any new unit is inherently experimental. Add to this the management techniques advocated in In Search of Excellence -- "Don't be afraid to make mistakes!" -- and the result is a willingness to try whatever's available.

The range of training methods available in and through Information Centers, now so wide, will narrow as InfoCenter staffs choose what works best. As is the case in so many areas that touch on computer technology, we are in a shake-out phase. These are interesting times.

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CASE STUDY: TRAINING

Given the task of directing end-user instruction, one Information Center tried everything, then stayed with what worked.

Prior to 1982, self-instruction was the only training method available to end-users at an insurance company's southern branch office. In the three years since an InfoCenter opened its doors with responsibility for training in both mainframe and pc hardware and software, the facility has experimented across the board.

The Center was designed to serve more than 600 end-users among a worksite population of fewer than 1,000, and the early approach was to try every sort of training at least once. None of the five

InfoCenter staffers had personnel or training backgrounds -- all were programmers -- yet the staff was frequently used to provide instruction. Not surprisingly, end-users were soon being sent to off-site training programs, while independent instructors were brought to the facility for both hardware and software training. The scattershot approach had middling results: "better training procedures" did not rate highly among the Center's benefits.

By the end of 1984, self-instruction was in rapid decline. The InfoCenter staff still boasted technicians, but three years of "training the trainers" had increased their instructional skills, and their manager foresaw greater use of in-house training ahead in '85. "Easier instructional materials" from vendors was high on the manager's wish list. Fewer end-users will be sent away for training, and those that are will more likely go to independently run programs than to vendor-operated ones. The company remains willing to experiment: computer-based training will make its debut in '85.

After three years of across-the-board experience, and with an investment of $200,000 in pc software in 1984 alone, the lesson learned was that end-users can best be taught by their colleagues, and next best by independent sources.

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There are indications, however frail, that the shake-out period is yielding solid results. Tables 20a and 20b on the following page compare software training methods frequently used at InfoCenter and non-InfoCenter worksites, broken out by company size. (The choice offered in our questionnaire was for frequent, infrequent, or not-at-all use.) By paying particular attention to large company respondents, we note **greater** use of in-house training and equal or **lesser** use of all other manners of instruction (except computer-based training) by InfoCenter staffs. Most significant among the lesser-used methods is "self-instruction"; almost by definition there should be less of this technique at InfoCenter worksites than elsewhere. There are statistical abberations in other data, but they generally point the same way: Information Centers make somewhat lesser use of self-instruction and greater use of in-house trainers than non-InfoCenter worksites. It is a trend that should continue.

We will look again at training methods when we investigate the functions performed and benefits realized from Information Center operations. Here we have been concerned with the training environment in which InfoCenters arise, and their immediate effect upon training techniques. We can see, amid the hurly-burly, the beginning of a trend towards greater use of in-house instructors, and a more discriminating approach towards the great variety of other techniques offered by vendors and independent sources. Information Centers are expected to make a difference in training, and that difference will begin to show in 1985.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Software Training Methods	Total IC's #	Pct.	Annual Sales: Below $50M #	Pct.	$50M - $500M #	Pct.	Above $500M #	Pct.
Self-instruction by end-users	87	55.1	17	51.5	27	49.1	35	59.3
Instruction by in-house trainers	102	64.6	17	51.5	33	60.0	44	74.6
Vendor manuals or cassettes	74	46.8	11	33.3	22	40.0	34	57.6
Vendor-operated on-site program	11	7.0	2	6.1	5	9.1	4	6.8
Vendor-operated off-site program	13	8.2	5	15.2	6	10.9	1	1.7
Independently produced manuals or cassettes	28	17.7	3	10.0	9	16.4	13	22.0
Independent on-site training	20	12.7	5	15.2	8	14.5	6	10.2
Independent off-site training	9	5.7	1	3.0	6	10.9	1	1.7
Computer-based training	37	23.4	5	15.2	10	18.2	19	32.2

Table 20a. Software Training Methods Frequently Used by InfoCenters
(By Annual Sales/Budget)

NON-INFOCENTER RESPONDENTS (Sample: 185; Total includes 7 not giving annual sales) Software Training Methods	Total Resp. #	Pct.	Annual Sales: Below $50M #	Pct.	$50M - $500M #	Pct.	Above $500M #	Pct.
Self-instruction by end-users	125	67.6	79	70.3	28	66.7	16	66.7
Instruction by in-house trainers	95	51.4	48	42.9	27	64.3	15	62.5
Vendor manuals or cassettes	114	61.6	70	62.5	23	54.8	18	75.0
Vendor-operated on-site training	11	5.9	5	4.6	2	4.8	4	16.7
Vendor-operated off-site training	22	11.9	9	8.1	4	9.5	7	29.1
Independent manuals or cassettes	30	16.2	17	15.2	7	16.7	6	25.0
Independent on-site training	15	8.1	12	10.7	2	4.8	1	41.7
Independent off-site training	10	5.4	5	4.5	2	4.8	2	8.3
Computer-based training	27	14.6	18	16.1	3	7.1	5	20.8

Table 20b. Software Training Methods Frequently Used at Non-InfoCenter Sites
(By Annual Sales/Budget)

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FORM FOLLOWS FUNCTION: WHAT INFORMATION CENTERS DO

The tasks assigned to an Information Center, and the authority it wields in an organization, derive from the perceived need for such services at the time the new unit began.

Our survey questionnaire asked respondents to recall those factors considered most significant in the decision to form an Information Center. We offered 17 choices; a rating of 5 signaled a most signficant factor, while a 1 indicated that little or no importance was attached to the item. Table 21 below exhibits the percentage of InfoCenter respondents who rated the listed factors at 5 or 4.

INFOCENTER RESPONDENTS (Sample: 158) Factors Weighed	Total IC's		Annual Sales: Below $50M		Annual Sales: $50M - $500M		Annual Sales: Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Improving DP/end-user relationships	94	59.5	16	48.5	35	63.6	37	62.7
Training in software use	94	59.5	16	48.5	33	60.0	36	61.0
Assisting in selection of software	89	56.3	15	45.5	26	47.3	40	67.8
Standardizing micro hardware	88	55.7	10	30.3	28	50.9	41	69.5
Providing access to corporate data	82	51.9	14	42.4	30	54.5	30	50.8
Assisting in selection of micro's	80	50.7	9	27.3	28	50.9	36	61.0
Monitoring the purchase of micro's	77	48.7	9	27.3	28	50.9	33	55.9
Ensuring micro/mainframe compatibility	76	48.1	8	24.2	25	45.5	36	61.0
Standardizing micro software	76	48.1	7	21.2	26	47.3	35	59.3
Easing DP backlog	75	47.5	13	39.4	33	60.0	25	42.4
Supervising micro/mainframe links	75	47.4	6	18.2	28	50.9	34	57.6
Monitoring purchase of software	72	45.5	12	36.4	26	47.3	27	45.8
Training in computer use	87	45.0	13	39.4	31	56.4	36	61.0
Protecting security of corporate data	55	34.8	9	27.3	21	38.2	22	37.3
Monitoring access to corporate data	38	24.1	10	30.3	11	20.0	15	25.4
Providing in-house hotline service	37	23.4	6	18.2	10	18.2	17	28.8
Directing an in-house computer store	9	5.7	1	3.0	5	9.1	3	5.1

Table 21. Significant Factors in Decision to Start an InfoCenter (By Annual Sales/Budget)

It is significant, in a study of technological innovation, to find an interpersonal problem rather than a technical one leading the list. Notice that while the technical problem, "Easing DP Backlog," was rated significant by fewer than half the respondents, the personal problem, "Easing DP/End-User Relationships," heads the list; the issue was considered vital by 60 per cent of those surveyed. This shows -- and it is a happy showing -- that in the whole realm of end-user computing, companies put more emphasis on the end-user -- the person — than on the computing.

Information technology does not store, compute, or distribute data by itself. People feed in the numbers; people program the computations; people authorize the distribution of the results. Organizational battles have been waged over questions of which people get to do what with corporate data.

Power is at stake -- power which, until the advent of microcomputers, lay unchallenged in the hands of the data processing professionals. They had rightful concern for the integrity of their data. To be worth anything, information must be accurate and timely, and its worth may actually diminish if it is readily available to anyone who can push a button to bring it up on a terminal screen. The danger increases drastically if those "dumb" terminals turn "smart," and assume the capability to enter data into the mainframe. Microcomputers posed an obvious threat to the worth of the corporate databank; it was DP's responsibility to protect that worth. The problem in DP/end-user relations was based on real issues, not on language barriers or personal insensitivity -- although, no doubt, these latter factors exacerbated the problem.

The backlog itself was equally real. Under the subhead, "The typical data processing department has a three-year backlog of development and maintenance work," the January 1984 issue of Datamation declared that "The figure most often quoted for the backlog of data procesing tasks is about three years, although some companies report backlogs of up to seven years. And, of course, this is only the formal backlog -- the backlog that has resulted in specific requests made to the data processing department. The hidden backlog, consisting of tasks that have not been submitted, may be even larger . . . "*

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CASE STUDY: EASING DP BACKLOG

When a large manufacturing company started an Information Center in 1983, little else mattered besides easing the data processing backlog and cooling off heated relations between the DP department

*G. Brown & D. Sefton, "Micro vs. Applications Logjam," Datamation, 1/84, p. 96.

and those who used the data it generated. On our questionnaire's scale of 1 to 5, every other concern -- providing access to corporate data, standardizing hardware and ensuring compatibility, and a dozen other choices -- rated a 1; "Easing DP backlog" got a 5, and "Improving DP/end user relations" a 3.

At start-up, there were fewer than 10 microcomputers at corporate headquarters; by the end of 1984, there were more than 200, representing a half-million dollar expenditure. Only 1 in 5 of these new pc's was linked to the mainframe, but that was enough to require an $80,000 expenditure on increased storage capacity. Another $80,000 was spent on pc software, half of it for spreadsheet packages. InfoCenter staff quickly doubled to handle evaluation and training duties, a pc repair shop and an in-house computer store. Hardware and software purchases were charged to end-user departments, and prior time-sharing procedures allowed charges for data storage, but in the general rush no other chargeback policies were formulated.

Did it work? Asked what benefits were realized from the InfoCenter, its manager rated all but one of the available choices at 5 (most important) -- increased standardization, increased compatibility, better training procedures, increased productivity, increased cost-effectiveness of hardware and software. Which choice rated only a 3? "Lessened DP backlog."

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Save for "Easing DP Backlog," the whole cluster of issues cited as "most significant" by approximately half of our respondents, from "Assisting in selection of software" (56.3 per cent) to "Training in computer use" (45.0 per cent) are in essence the same issue: how to put computer power into the hands of those who use computer-generated data. Most of these particulars involve the integration of microcomputers into the organization's information technology network; others involve acquainting end-users with mainframe hardware and software.

It may surprise the reader to note that security issues were rated "most significant" by only a third of our respondents. The problem being addressed in the early stages of an InfoCenter's life was how to put data into people's hands, not how to keep data out of those hands.

In theory at least, Information Centers could maintain a reading on what departments were drawing on corporate data. While enabling individuals to draw on corporate data to do their own computing, the InfoCenter might at the same time monitor the use of corporate information, thereby guarding its integrity.

It remained more theory than practice; "Monitoring access to corporate data" is near the bottom of the list on Table 21, considered important by fewer than one-quarter of our respondents.

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THE "NEED TO KNOW" AT M&M MARS

"I have a group of consultants that could probably gain access to any file that M&M Mars uses . . . and their charge in life is to help people answer questions. I am more concerned that they do that than that they break a security rule . . .

"M&M Mars . . . is an extraordinary organization, and their policy basically states that if somebody wants to know something, the presumption is that he has a need to know, and that therefore it's okay for him to know."

David P. Widup
Information Services Group
M&M Mars, Inc.

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From factors considered important at start-up, let us now move to examine what functions Information Centers actually assumed as they became operational. Tables 22a and 22b on the following pages show the data. Our survey found that the functions assigned to an Information Center varied only somewhat by company size, but shifted significantly according to the year the Center went operational.

Microcomputer issues, the most significant factors in the decision to implement an Information Center (Table 21), were naturally the prime concerns of InfoCenters when they actually began operations. Across the board, regardless of company size, training in microcomputer use and evaluating microcomputer hardware and software became the province of two-thirds of all InfoCenters at start-up; the figure leaps to four-fifths among Centers implemented in the past two years.

Major differentiations by company size, though few, are interesting. Micro training and evaluations of micro hardware and software were more likely to be assigned to large company InfoCenters than small ones; small company Centers were more likely to perform mainframe-related tasks, especially the coordination of downloading from and uploading to corporate databases. This reflects what we have already seen (Table 2, page 12): small companies were less likely to have any microcomputers at all on premises at implementation than larger concerns.

As before, these statistics based on company size reflect the less stratified nature of smaller organizations. In firms of under $10 million in sales -- we have 19 such respondents, or 12 per cent of all InfoCenters surveyed -- the Information Center and the MIS/DP function are likely to be synonymous; whatever function the data processors fulfill is identified as an Information Center function. This fact explains the most remarkable statistic in Table 22a: that 60.6 per cent of small company InfoCenters, as against 27.2 per cent of mid-sized and 38.9 per cent of large company units, assumed the task of creating applications software for end-users. But these respondents, by assisting end-users in computer applications, nonetheless fulfill our definition, and deserve the account we pay them.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Tasks Assumed At Start-Up	Total ICI's #	Total ICI's Pct.	Annual Sales: Below $50M #	Below $50M Pct.	$50M - $500M #	$50M - $500M Pct.	Above $500M #	Above $500M Pct.
Training in use of microcomputers	111	70.3	20	60.6	38	69.1	45	76.3
Evaluating micro hardware/ assisting in selection	107	67.7	18	54.5	37	67.3	44	67.8
Evaluating micro software/ assisting in selection	107	67.7	15	45.5	37	67.2	48	81.3
Training in use of micro software	103	65.2	16	48.5	34	61.8	45	76.3
Training in use of mainframe software	93	58.9	17	51.5	35	63.6	36	61.0
Directing an in-house computer hotline	70	44.3	10	30.3	23	41.8	32	54.2
Training in use of mainframe terminals	69	43.7	16	48.5	24	43.6	25	42.4
Evaluating mainframe software	69	43.7	14	42.4	27	49.1	26	44.1
Creating applications software for end-users	60	38.0	20	60.6	15	27.2	23	38.9
Authorizing microcomputer purchases	56	35.4	11	33.3	23	41.8	19	32.2
Authorizing micro software purchases	52	32.9	11	33.3	17	30.9	20	33.9
Authorizing micro/mainframe linkages	50	31.6	8	24.2	19	34.5	19	32.2
Authorizing download of corporate data	50	31.6	14	42.4	19	34.5	13	22.0
Maintaining & repairing microcomputers	33	22.9	6	18.2	13	23.6	12	20.3
Directing timesharing operations	36	22.8	13	39.3	8	14.5	12	20.3
Authorizing mainframe terminal usage	35	22.2	10	30.3	13	23.6	10	16.9
Authorizing uploading of data into corporate databank	32	20.3	15	45.5	11	20.0	5	8.5
Other	21	13.3	3	9.1	10	18.2	8	13.6
Running an in-house computer store	13	8.2	1	3.0	4	7.3	8	13.6
Don't know/No answer	7	4.4	1	3.0	4	7.3	1	1.7

Table 22a. Tasks Assumed by InfoCenters at Start-Up
(By Annual Sales/Budget)

A glance at Table 22b below confirms the microcomputer explosion of the past two years. Fewer than half the Information Centers formed prior to 1983 had responsibility (at that time) for training in and evaluations of microcomputer hardware and software; more than 80 per cent begun in '83 and after were assigned that task. The job of authorizing purchases of microcomputer material was the concern of less than 20 per cent of "mature" Centers at start-up, but nearly half of the newer centers were granted such authority from their beginning. Conversely, responsibility for training in mainframe use fell off: 52.9 per cent of "mature" centers were granted that franchise at start-up, but only 39.2 per cent of newer centers were handed the same task. Confirming what we have seen earlier, timesharing operations have become a lesser concern in recent years.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 10 not giving year of start-up) Tasks Assumed At Start-Up	Year of Start-Up: Pre-1983 #	Pre-1983 Pct.	1983-84 #	1983-84 Pct.
Training in use of microcomputers	24	47.1	83	85.6
Evaluating micro software/ assisting in selection	22	39.2	81	83.5
Evaluating micro hardware/ assisting in selection	26	50.9	78	80.4
Training in use of micro software	23	45.1	76	78.4
Creating applications software for end-users	23	45.1	34	65.9
Training in use of mainframe software	35	68.8	54	55.7
Directing an in-house computer hotline	21	41.2	44	45.4
Authorizing micro software purchases	7	13.7	43	44.3
Authorizing microcomputer purchases	10	19.6	42	43.3
Evaluating mainframe software	24	47.1	41	42.3
Authorizing micro/mainframe linkage	8	15.7	40	41.2
Training in mainframe terminal use	27	52.9	38	39.2
Authorizing download of corporate data	12	23.5	37	38.1
Maintaining & repairing microcomputers	4	7.8	28	28.9
Authorizing mainframe terminal usage	12	23.5	22	22.6
Authorizing uploading of data into corporate databank	11	21.6	21	22.0
Directing timesharing operations	17	33.3	19	19.6
Other	6	11.8	13	13.4
Running an in-house computer store	2	3.9	10	10.3
Don't know/No answer	3	5.9	0	0.0

Table 22b. Tasks Assumed by InfoCenters at Start-Up
(By Year of Implementation)

The varied tasks assigned to the Information Center at start-up and still performed by them divide into four basic categories:

1. Evaluations of mainframe and micro hardware and software;
2. Authorizations of mainframe and micro purchases, of linkages, and of data transfers;
3. Training in the use of mainframe and micro products; and
4. Special assignments such as creating special applications software, maintaining and repairing equipment, directing timesharing operations, and similar services for end-users.

To answer fully the question of what Information Centers do, let's examine each of these categories in some detail.

Evaluations: Kicking the Tires on the Used-Car Lot

There are more than a dozen nationally advertised brands of microcomputer hardware, and hundreds of packages of applications software. To sort through the claims of the former and the catalogs of the latter is at best difficult and at worst maddening. Information Center professionals trust their own experience first and foremost. Table 23 below shows which sources of information InfoCenter managers rate most highly.

VALUED SOURCES OF INFORMATION
(Sample: 158 InfoCenter Respondents)

Rated 4 or 5 on a 1-5 scale:	#	%
Hands-on testing	117	74.0
Vendor material	93	58.9
Word of mouth	92	58.2
Trade publications: editorial content	74	46.8
Professional meetings	65	41.1
Vendor representatives	51	32.3
Subscription rating services	46	29.1
Trade publications: advertising	35	22.1
Mass market publications: editorial content	26	16.5
Computer shows	25	15.8
Mass market publications: advertising	11	6.9
Other sources	3	1.9

Table 23. Information Sources Most Valued by InfoCenters

Next best to hands-on testing, say the professionals, is talking to someone else who has. The market trusts the vendor's printed word far more highly than their salesman's personal pitch; a vendor's ad in a trade publication carries three times the kick as an ad in a mass-market magazine. And whereas professional meetings are valuable to nearly half the respondents, fewer than one in five sees much value in a computer show.

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CASE STUDY: HOME GROWN TALENT

How does a major computer firm organize an Information Center of its own? In most ways, not very differently from any other company of its size.

Its midwestern corporate headquarters did not develop an InfoCenter until 1984, nor did it begin to link personal computers to its mainframe until then. It trained end-users with manuals or cassettes supplied by vendors or independently. It faced a data processing backlog which it rates "most important" in the decision to create a Center, and it staffed the facility with computer specialists rather than trainers.

It did perform an extensive needs analysis, reaching down to include four levels of management and across the board to interview administrative and corporate personnel in the planning process. The major concerns discovered in the process had to do with improving DP/end-user relations, ensuring pc/mainframe compatibility, supervising pc/mainframe links, and selecting pc software.

At its inception, the InfoCenter took responsibility for evaluations and training in all type of hardware and software, and for authorizing links, downloading and uploading -- but did not go so far as to require an InfoCenter signature on purchases of pc hardware and software. It proceeded to follow a full range of hardware strategies: three types of distributed facilities (mainframe terminals, pc's linked to mainframes, and the dumb terminal/mini-computer/mainframe option), as well as local facilities and standalone pc's. Start-up hardware costs were $30,000, as anticipated, but more money was spent in the first year of operations: $50,000 to upgrade the mainframe's operational capacity, a like amount for additional terminals, $30,000 on a new minicomputer.

One task performed by most InfoCenters was not assigned to this one: brand comparisons. All the computers at headquarters are the company's own.

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What are these InfoCenter staffs looking for when they evaluate products? Tables 24a and 24b display the importance placed on various criteria when evaluating hardware and software.

HARDWARE EVALUATIONS: IMPORTANT CRITERIA
(Sample: 158 InfoCenter Respondents)

Rated 4 or 5 on a 1-5 scale:	#	%
Ease of use	123	77.8
Vendor back-up/support	112	70.8
IBM compatibility	112	70.1
Ease of instruction	108	68.4
Range of applications	92	58.2
Cost	92	58.2
Mainframe compatibility	91	57.6
Volume discounts	71	44.9
On-line help facility	58	36.7
Tutorial mode	46	29.1
Windowing capability	25	15.8

Table 24a: Important Criteria in Evaluating Computer Hardware

SOFTWARE EVALUATIONS: IMPORTANT CRITERIA
(Sample: 158 InfoCenter Respondents)

Rated 4 or 5 on a 1-5 scale:	#	%
Ease of use	144	91.1
Ease of instruction	128	81.0
IBM compatibility	109	68.9
Vendor back-up/support	100	63.2
On-line help facility	93	58.8
Cost	81	51.2
Tutorial mode	77	48.7
Range of applications	76	48.1
Mainframe compatibility	76	48.1
Volume discounts	48	30.4
Windowing capability	23	14.6

Table 24b: Important Criteria in Evaluating Computer Software

Because so much of their activity involves training, InfoCenter professionals rate "Ease of Use" and "Ease of Instruction" above all other attributes. It is an even greater consideration in software than in hardware. An end-user, after all, will typically learn and use one piece of hardware, but may apply any number of different softwares.

For much the same reason, "range of applications" is a higher priority in hardware than in software; one can sift about among software packages for one to do the job, but an IC manager wants hardware which will do many jobs. Also, mainframe compatibility is a far higher priority for hardware than software.

Although "cost" is of equal concern in hardware and software, "volume discounts" are a far higher priority for big-ticket hardware purchases than for comparatively lesser-dollar software purchases.

"Vendor backup and support" rate highly for both hardware and software, but 10 per cent more IC managers rate it important for hardware than for software. More money is involved, and whereas one can invent, re-create or improve upon a software program on one's own, the same cannot be done for hardware.

In short: Want to sell a computer? Make it easy to learn and easy to use; give it a wide range of applications; back up the product and support the customer; if it's a pc, make it compatible with the mainframe (assuming it's an IBM mainframe won't hurt). You'll meet every criteria rated "most important" by sixty per cent of our respondent IC managers.

Want to sell a software package? Make it easy to use and to learn; include an on-line help facility. Make it IBM compatible. Back it up and hold the buyer's hand. Don't be overly worried about its price, and don't bother too much about volume discounts. Make it do one job well; don't concern yourself with its range of applications, and DO NOT include a windowing feature; you'll end up jumping through it. Many IC managers with whom we spoke actively consider "windowing" a negative factor in rating software criteria; it's too distracting, even confusing, for end-users who are not data professionals.

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THE VENDOR-MARKET INTERFACE: WINDOWING

There is considerable dispute between vendors and buyers as to how well end-user needs may be met by currently available software and hardware. The vendor's concept of "easy to learn/easy to use" is often at variance with the Information Center manager's. The heat emerging from the market/vendor interface is best measured by the experience of integrated software that features screen "windowing" -- software capable of displaying information from various files simultaneously on a screen, and of creating interactions between the data in the "windows." Vendors trumpeted this technology at computer shows and in trade advertising specifically directed at Information Center managers. They claimed that this sophisticated software was easily mastered by non-professionals.

We asked InfoCenter managers who put hands on the new material what they thought. "Cumbersome . . . confusing . . . needs a computer genius," said a New Jersey man whose Center serves 300 end-users. "Symphony looked good, but not many people can really take advantage of it. It's designed more for programmers than end-users," said an upstate New Yorker who directs a staff of four in a company employing nearly 10,000. "Windowing adds confusion," was the verdict drawn at a New York City-based insurance company's Center. And an InfoCenter manager at a New England public utility was reacting to vendor claims for windowing when he said, "I don't believe anybody. This business is worse than the used car business. There should be some kind of truth in advertising bill. Everytime I can, I like to kick the tires."

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Authorizations: Who's in Charge Here?

How much weight do these evaluations carry in organizations with Information Centers? Do InfoCenters play more than an advisory role in purchasing computer material? The larger the company and the larger the purchase cost, the more likely it is that Information Centers must sign on, and the more formal the justification policy.

As hardware purchases generally involve far more dollars, InfoCenter authority is greater and justification policies more stringent for hardware than software. For obvious reasons, mainframe compatibility (and IBM compatibility) are likewise a greater concern in hardware.

Tables 25a below and 25b on the following page show the actual authority Information Centers wield in hardware and software purchases.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Authority in Hardware Purchases	Total IC's		Annual Sales: Below $50M		Annual Sales: $50M - $500M		Annual Sales: Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
InfoCenter must be consulted	112	70.9	19	57.6	40	72.7	44	74.6
InfoCenter must approve purchase	86	54.4	16	48.5	29	52.7	36	61.0
Justification form required	77	48.7	8	24.2	30	54.5	32	54.2
Forecast of minimum $ savings or productivity increase required	70	44.3	10	30.3	27	49.1	27	45.8
Mainframe compatibility required	81	51.3	15	45.5	29	52.7	30	50.8
IBM compatibility required	88	55.7	9	27.3	36	65.5	37	62.7

Table 25a. InfoCenter Authority — Hardware Purchases
(By Annual Sales/Budget)

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Authority in Software Purchases	Total ICs		Annual Sales Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
InfoCenter must be consulted	92	58.2	20	60.6	26	47.3	38	64.4
InfoCenter must approve purchase	63	39.9	13	39.4	18	32.7	28	47.5
Justification form required	52	32.9	7	21.2	15	27.3	25	42.4
Forecast of minimum $ savings or productivity increase required	51	32.3	9	27.3	17	30.9	21	35.6
Mainframe compatibility required	40	25.3	11	33.3	15	27.3	11	18.6
IBM compatibility required	75	47.5	9	27.3	29	52.7	32	54.2

Table 25b. InfoCenter Authority — Software Purchases
(By Annual Sales/Budget)

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CASE STUDY: JUSTIFICATION AT MUTUAL OF OMAHA

No Information Center surveyed has so complete a justification and authorization policy as that at Mutual of Omaha. End-users there receive a bound 12-page packet printed on heavy stock to serve as a guide for end-users. The packet, entitled "Microcomputer Request Package," contains an explanation of Mutual of Omaha's microcomputer policies; a sample request form; a technical introduction to the company's standard components (including photographs); an outline of the seven modules which make up the company's microcomputer training program; and an actual request form to be forwarded to the Information Center.

Mutual of Omaha further requires a justifcation memorandum which end-users must submit six months after the installation of a microcomputer. The justification memo asks the end-user to report the major applications to which the micro has been dedicated, the approximate dollar savings realized from its use, and a forecast of additional dollar savings anticipated over the following 12 months.

The InfoCenter supports IBM personal computer hardware and IBM DOS software. It offers instruction in LOTUS 1-2-3 for spreadsheet uses, FRIDAY! and dBASE III for database management, and word processing operations. It will also design and instruct in the use of special applications software it develops according to end-user needs.

The forms may initially intimidate the computer neophyte, but first among the Center's services is assistance in completing these very forms. A staff of 28 data processors, analysts and programmers thus supports more than 200 standalone microcomputer end-users (and an additional 100 mainframe end-users) through its own in-house trainers and frequent use of independent on- and off-site training programs.

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IBM's dominant position in the marketplace forces upon Information Center managers a policy decision on IBM compatibility. The tables above on evaluations and authorizations demonstrate how many have made the decision in IBM's favor. It reflects positively on IBM's marketing strategy. Large companies are twice as insistent on IBM compatibility in software than small ones; the ratio is higher in the area of hardware compatibility. Moreover, the trend among InfoCenters runs evermore towards Big Blue, as the last line in Table 26 shows.

INFOCENTER RESPONDENTS (Sample: 148 Authority in Purchasing	Hardware				Software			
	Pre-1983		1983-84		Pre-1983		1983-84	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
InfoCenter must be consulted	31	60.8	77	79.4	31	61.8	59	60.8
InfoCenter must approved purchase	28	54.9	55	56.7	21	41.2	40	41.2
Justification form required	22	43.1	51	52.6	19	23.3	32	32.9
Forecast of minimum $ savings or productivity increase required	21	41.2	46	47.4	17	33.3	34	35.1
Mainframe compatibility required	24	47.1	53	54.6	11	21.6	26	26.8
IBM compatibility required	22	43.3	69	65.9	19	37.3	54	55.6

Table 26. InfoCenter Authority -- Hardware and Software Purchases (By Year of Implementation)

Three figures in Table 26 reveal major trends (differences of more than 10 per cent), and all three involve IBM compatibility. Two do so directly. IBM compatibility in hardware is a requirement of 43.3 per cent of "mature" Centers, compared with 65.9 per cent of newer centers; in software, 37.3 per cent of mature Centers, 55.6 per cent of newer ones. The third trend affects the situation less directly, but is nevertheless important: newer Centers are far more likely to be consulted prior to purchasing hardware. Remembering that two-thirds of all InfoCenters surveyed are in this "newer" group, and that newer Centers are more insistent on IBM compatibility, we have yet another indication of IBM's market dominance.

Like the rest of the market, Information Centers support IBM microcomputer hardware. We asked respondents to list what brands of microcomputers they had at their worksites. Most reported a large presence of IBM micro's together with a smaller number of other brands. Table 27 displays the response.

INFOCENTER RESPONDENTS
(Sample: 142)

% IC's Using	Brand	% IC's Using	Brand	% IC's Using	Brand
28.9	Apple	16.2	Hewlett-Packard	3.0	NCR
0.7	AT&T	2.1	Honeywell	7.7	Tandy
7.0	DEC	88.0	IBM	7.0	Wang
0.0	Exxon	0.0	Intel	34.5	Others

Table 27. Microcomputer Brands Present at InfoCenter Worksites

"The Daunting Power of IBM," headlining a business article in the January 20, 1985, New York Times, is typical of a steady stream of features and cover stories. ". . . And the Winner Is IBM," Business Week proclaimed on the cover of its October 3, 1983 issue on personal computers, leading InfoSystems to ask on its July 1984 cover, "Will Success Spoil IBM?" Fortune, in December 1984, wondered "Is IBM Playing Too Tough?" Whatever answer it gave did not keep Big Blue off Fortune's cover a month later as one of "America's Most Admired Corporations."

At separate AMA-sponsored roundtables of vendors and Information Center managers the IBM spectre hovered overhead. Among its competitors, IBM engenders a remarkable combination of resentment and respect. Said one participating vendor, "We're all IBM's research and development department. They stay a half-step behind in new products and then leap ahead when the market coalesces around a favorite." Said another: "Not one of us would be doing it any differently in their place." A New York based information systems consultant insisted that "IBM protects the data processing people. I really don't say that with any kind of perjorative implications . . . " -- at which point an InfoCenter manager interjected, "You should."

"No one," goes a phrase often heard in our research, "ever got in trouble for going with IBM." So long as Big Blue continues to provide what the market looks for, no one ever will. Hardware and software that is relatively easy to learn and easy to use, backup and support for customers, and competitive costs are what InfoCenter managers look for; they do not differ importantly from other consumers of computer technology.

Purchasing is by no means the only area in which Information Centers wield authority. Data transfers, and the physical links that make transfers possible, are the responsibility of nearly a third of those surveyed. Small company units are especially involved in such activities; 42.4 per cent of small company

InfoCenters must authorize any downloads from the corporate database to end-user screens, and a higher number (45.5 per cent) must authorize uploading. However, less than one in four small company Centers authorize mainframe/micro linkages, but one in three large company units do so. A review of Tables 22a and 22b (pages 41 and 42) will show authorization activities by company size.

Training: The Raison d'Etre

We have already studied the training environments at Information Center worksites prior to implementation. We compared pre-IC instruction (in Table 19) with 1984 practices, and frequently used techniques (in Tables 20a and 20b) with those at non-InfoCenter sites. To discover what trends are at work, let's take a side-by-side look at training methods favored by mature and new Centers. Table 28 below makes that comparison.

INFOCENTER RESPONDENTS (Sample: 148) Training Methods Used - 1984	Hardware				Software			
	Pre-'83		'83-'84		Pre-'83		'83-'84	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Self-instruction by end-users	23	45.1	45	46.4	26	51.0	60	61.9
Instruction by in-house trainers	27	52.9	59	60.1	32	62.7	64	66.0
Vendor manuals or cassettes	16	31.3	40	41.2	22	39.2	49	50.5
Vendor-operated on-site training	3	5.9	10	10.3	1	2.0	10	10.3
Vendor-operated off-site training	3	5.9	9	9.3	4	7.8	8	8.2
Independently produced manuals or cassettes	5	9.8	13	13.4	8	12.0	20	20.6
Independent on-site training	6	11.8	7	7.2	10	19.6	9	9.3
Independent off-site training	4	7.8	4	4.1	4	7.8	4	4.1
Computer-based training program	5	9.8	16	16.5	10	19.6	27	27.8

Table 28. Frequently Used Hardware and Software Training Methods (By Year of Implementation)

Though there are exceptions, newer Centers are more likely to use any particular training method for the reasons discussed in Chapter 4, as newer Centers are likely to have a higher percentage of end-users needing initial training. By definition, mature Centers have been at the job longer, have cast around experimentally and have refined their techniques. Mature Centers are less likely to teach with manuals and cassettes, more likely to employ in-house trainers. On the other hand, newer Centers are more likely to bring in vendor programs or send end-users to such programs. Training of all types remains the primarly task of Information Centers, as Table 29, on the following page, will show.

More than two-thirds of Information Centers surveyed listed "Training in Software Use" and "Assistance in Software Selection" among their most frequently requested services; those categories are divided into requests by software type in Table 29 below. Note that large company InfoCenters gave more training in communications integrated software packages, small company units more in general ledger; and that everyone trains or advises in selection of spreadsheet software above all else.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Frequently Requested Services -1984	Total IC's		Annual Sales Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Training in software use								
Spreadsheets	98	62.0	14	42.4	37	67.3	39	66.1
Word processing	74	46.8	14	42.4	24	43.6	30	50.8
Database management	51	38.7	10	30.3	21	38.2	26	44.1
Integrated software	48	30.4	8	14.5	19	34.5	19	32.2
Communications	27	17.1	3	9.1	10	18.2	12	20.3
General ledger	14	8.9	8	24.2	3	5.5	2	3.4
Assistance in software selection								
Spreadsheets	80	50.6	10	30.3	28	50.9	35	59.3
Word processing	54	34.2	8	24.2	17	30.9	24	40.7
Database management	47	29.8	9	27.3	12	21.8	22	37.3
Integrated software	41	26.0	7	21.2	16	29.1	16	27.1
Communications	35	22.1	4	12.1	12	21.8	15	25.4
General ledger	13	8.2	7	21.2	3	5.5	5	8.5
Training in use of hardware	81	51.3	14	42.4	25	45.5	35	59.3
Assistance in hardware selection	68	43.0	8	24.2	24	43.6	30	50.8
Creating systems application software	49	31.0	14	42.4	19	34.3	13	22.0
Communication with on-line databases	39	24.7	12	36.4	9	16.4	15	25.4
Hardware maintenance and repair	32	20.3	9	27.3	13	23.6	7	11.9
Downloading from mainframe	22	13.9	2	6.1	11	20.0	9	15.3
Installation of mainframe link	20	12.7	4	12.1	6	10.9	10	16.9
Local area networking	17	10.8	6	18.2	5	9.1	6	10.2
Dial-up communications	17	10.8	3	9.1	5	9.1	7	11.9
Computer language interfacing	13	8.2	4	12.1	4	7.3	5	8.5
Uploading to mainframe	11	7.0	3	9.1	4	7.3	4	6.8

Table 29. InfoCenter Services Most Frequently Requested in 1984
(By Annual Sales/Budget)

Special Assignments: Leaping into the Breach

Into the special assignment category fall all those functions requiring technical expertise that end-users do not ordinarily possess. The most frequently requested of these is the creation of applications software. Most InfoCenter managers with whom we spoke agree that times are changing. Two years ago they were frequently required to create software to fill end-user requests; today, more often than not, there is pre-packaged software on a store shelf or in a catalog that will do the job. Still, 30 per cent of our respondents listed "creating systems application software" among the services most frequently requested in 1984, and the percentage was higher (42.4 per cent) among smaller companies, presumably with more specialized needs.

Many InfoCenters, having grown out of timesharing operations, still supervise such functions -- more so in small companies (39.3 per cent) than mid-sized (14.5 per cent) or large ones (20.3 per cent). Some are proprietors of in-house computer stores, naturally more likely in large companies (13.6 per cent) than small ones (3.0 per cent).

Adapting hardware to special needs would likewise fall into this category, but the editors here express the wish that a hardware vendor will be found to fill the specific request of Ms. Cathy Anderson, Manager of Office Automation for the Holstein (Cattle) Association, headquartered in Vermont. To the question, "Is there something you wish were on the market that isn't there?", Ms. Anderson responded with extreme precision: "Yes, a hand-held device that can work outdoors in heat and freezing cold, and which can upload and download via dial-up commmunications." The Holstein farmers of America who are members of the Association have a solid professional working in their interest.

Summary: InfoCenters in Operation

We find the major share of Information Centers at the corporate headquarters of large organizations. There they do their evaluations, weild their authority, coordinate training and perform special assignments. Before reporting additional survey results on staffing and costs, it would be well to look at two Information Centers in operation -- two which compare and contrast most interestingly.

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CASE STUDY: SIDE-BY-SIDE IN MOTOR CITY

Two major American automotive firms -- the American Motors Company and the Chrysler Corporation -- began Information Centers at their Detroit locations in 1983. A comparison is

informative, for although the new units arose in different circumstances and adopted different approaches towards end-user computing, they arrived at remarkably similar conclusions as to the benefits of an Information Center.

Hardware & Training Strategies

At Chrysler, prior to 1983, local standalone systems served a variety of functional groups, and a timesharing operation coordinated use of a remote computer. Typically, the Information Center grew out of the timesharing facility, which lost its separate identity when the Center came on line. Chrysler used several training methods: employees were given training materials from both vendors and independent sources; vendors gave training programs at the plant; workers were sent to off-site programs.

AMC offered fewer options. All instruction in both hardware and software was handled by in-house trainers, who taught the use of mainframe workstations only. Not until the Information Center was open for business were standalone microcomputers added to the mix.

Different factors had weight in the separate decisions to start Information Centers. At Chrysler, a data processing backlog was the uppermost problem; at AMC, it seemed hardly a problem at all, although DP/end-user relations were in need of mending. Conversely, at AMC assisting in the selection of personal computers and monitoring their purchase was a high priority; at Chrysler, these issues were insignificant. Both companies did place similar importance on evaluating and selecting microcomputer software, but to AMC it was highly important to standardize the software, while at Chrysler standardization of pc software hardly mattered. As if to emphasize their differences, the companies chose different names for the new units. At Chrysler, it was an Information Center; at AMC, "End User Services."

Chrysler's unit was for the most part concerned with training in mainframe applications; the AMC Center concentrated on microcomputer usage. Thus Chrysler's start-up costs included a $20,000-per-month mainframe budget, with an additional monthly $1,400 for added terminals; AMC incurred no new mainframe costs, but spent $36,000 on "courtesy" microcomputers.

Only in staffing were the two units similar. At Chrysler, the head of the new unit was a middle manager with expertise in management

information services, heading a full-time staff of six data processors. Exactly the same could be said of the AMC unit chief, except that the staff was slightly smaller: five, in all.

With all this, the two Centers served a remarkably similar clientele. Although the Chrysler operation handled more than twice as many end-user requests in its first year of operation, the spread of management strata and functions was almost identical:

End-User Requests:	Chrysler	AMC
By Management Level		
Senior Management	10%	--
Middle Management	10%	20%
Supervisory Management	30%	40%
Exempt, Non-Supervisory	40%	40%
Non-Exempt	10%	--
By Function		
Corporate	10%	10%
Sales	20%	15%
Finance	40%	40%
MIS/DP	10%	10%
Human Resources	5%	--
Purchasing	5%	5%
Administration	10%	10%
Other (Manufacturing Plants)	--	10%

Growth in 1984

In the year past, Chrysler's InfoCenter staff grew enormously. The number of supervisors increased from 2 to 5, one with expertise in marketing. The number of programmers (exempt non-supervisory staff) zoomed to 22 , and 2 administrative aides were added. Expenses also advanced: the monthly mainframe budget went to $135,000, and half a million was spent on mainframe applications software.

The AMC unit, serving a smaller worksite population of exclusively corporate headquarters personnel, kept its size but expanded its mission. While spending $400,000 on microcomputers, $40,000 on spreadsheet software and $16,000 on word processing packages, it also entered into mainframe expenditures: $16,000 for mainframe terminals and $60,000 for mainframe applications software. AMC charged back to end-user departments not only its hardware and

software purchases but also installation and hookup costs, as well as overhead charges. For its part, Chrysler has chargeback policies for data storage and connect time, but no other expenditures.

Still divided by their original strategies and missions, the Centers report very different figures for linkage: only 10 per cent of AMC's microcomputers are linked to the mainframe, while more than half of Chrysler's are on line. They also differ in brand preference: 80 per cent of Chrysler's pc's are from IBM, 60 per cent of AMC's are from Wang (the other 40 per cent are indeed Big Blue). With its mainframe bias, the Chrysler unit fields few requests for evaluations of pc software; much of AMC's activities are in this area. AMC hardly deals with computer language interfacing; Chrysler rated this among its most frequently requested services.

The AMC Center wields more authority in both hardware and software purchases; this again reflects the personal computer focus there, as opposed to the Chrysler shop's mainframe responsibilites. The AMC Center must approve all hardware and software purchases; the Chrysler unit need not necessarily be consulted about such purchases.

Both centers plan to expand their clientele in 1985, and will add staff to do so. The American Motors Center expects an increase in contacts with the manufacturing and R&D functions; so does Chrysler. Both units will up their use of computer-based training methods; neither forecast other important changes in their training operations.

With roles so different, the two Centers are remarkably alike in rating their contributions to their respective companies. According to both, the most important benefits realized from their operations are increased end-user productivity and greater compatibility between micro- and mainframe hardware. Both say they have made hardware and software more cost-effective -- but neither claims to have lessened the DP backlog to any great extent.

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PROGRAMMERS AND PROCESSORS: INFORMATION CENTER STAFFING

As training is central to Information Center functions, staffing decisions must follow the answer to this question: should computer experts be taught to train, or should trainers be taught computer skills? There is no doubt that the former alternative is the most popular. Among our InfoCenter respondents we found but five that put a trainer in charge of the operation at start-up, and only eight that placed training specialists above the supervisory level on the new unit's full-time staff. In all, only 26 respondents, or 16.5 per cent, put any trainers at any management level on the InfoCenter staff at implementation, full or part time. Programmers, systems analysts and data processors from the MIS/DP functions provided the lion's share of both the managers and the staff at implementation.

Table 30 below shows the level and expertise of managers of respondent InfoCenters at implementation.

INFOCENTER RESPONDENTS
(Sample: 158)

Management Level	CORP.	MIS/DP	FINANCE	SALES	HUMAN RESRCES*	OTHER**
Senior management	10	16	1	1	1	5
Middle management	8	61	5	4	3	7
Supervisory management	1	32	6	2	1	4
Exempt, Non-Supervisory	0	13	5	4	0	1
Non-exempt	0	2	0	0	0	1

*Human Resources includes Training
**Other includes Administration, manufacturing, and purchasing

Table 30. Information Center Managers (at Start-Up)

Among the relative few to put a training specialist on staff was the Digital Equipment Corporation; evidently those most familiar with computers know the value a trainer can bring to instruction. It is certainly arguable that training can be sub-contracted to outside specialists, and thus there is no real need for training expertise on an Information Center staff; but as we have seen, more than 75 per cent of InfoCenters train with their own personnel, and without a training expert on staff, who can best judge the results achieved by outside consultants?

The issue is of special concern because, as we shall see, there is an important gap between expectation and fulfillment in the training function provided by Information Center staffs. Most of them train; most of them field training requests more than any other task; but fewer than half rate "better training procedures" among the significant benefits they provide. The problem may begin here, at staffing.

The number of staffers assigned to the new unit at start-up was less a function of company size than of worksite population. Average full-time start-up staff was 3.9 people -- and exactly the same on average at small companies (4.15 staffers) as large ones (4.18). Small companies were twice as likely to assign personnel to the staff on a part-time basis. We found, as expected, a heavier representation of senior managers among smaller company InfoCenters. The major share of staffers were programmers and processors, many from the "Exempt Non-Supervisory" level. Table 31 below shows how our respondents decided what management levels to assign to InfoCenter staffs at implementation.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Management Assignments - Start-up	Total IC's		Annual Sales: Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
FULL-TIME STAFF								
Senior management	12	16.8	12	36.4	5	8.1	3	5.1
Middle management	50	31.6	13	39.4	16	29.1	17	28.8
Supervisory management	54	34.2	15	44.5	11	20.0	26	44.1
Exempt, non-supervisory	96	60.8	13	39.4	32	58.2	42	71.2
Non-exempt	34	21.5	9	27.3	12	21.8	12	20.3
PART-TIME STAFF								
Senior management	5	3.2	4	12.1	0	0.0	1	1.7
Middle management	19	12.0	2	6.1	9	16.4	7	11.9
Supervisory management	10	6.3	2	6.1	2	3.6	7	11.9
Exempt, non-supervisory	18	11.4	3	9.1	6	10.9	6	10.2
Non-exempt	12	7.6	5	15.2	2	3.6	3	5.1

Table 31: Staff Assignments by Management Level at InfoCenter Start-Up
(By Annual Sales/Budget)

In the relatively short time that most respondent Centers have been active, staff has grown by more than 25 per cent overall, and more than 40 per cent in large organizations. Major growth in such large company InfoCenters has been in the middle management and supervisory range. Ten per cent more companies are assigning staff from these levels in 1984 than did so at start-up. Table 32 on the following page shows the change.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Management Assignments - 1984	Total IC's #	Pct.	Annual Sales Below $50M #	Pct.	$50M - $500M #	Pct.	Above $500M #	Pct.
FULL-TIME STAFF								
Senior management	23	14.6	10	30.3	9	16.4	3	5.1
Middle management	65	41.1	14	42.4	22	40.0	25	45.5
Supervisory management	71	44.9	12	36.4	19	34.5	34	61.8
Exempt, Non-Supervisory	102	64.5	15	45.5	33	60.0	48	81.3
Non-Exempt	43	27.2	10	30.3	13	23.6	18	30.5
PART-TIME STAFF								
Senior management	6	3.8	4	12.1	0	0.0	2	3.4
Middle management	12	7.6	1	3.0	7	12.7	3	5.1
Supervisory management	8	5.1	0	0.0	2	3.6	5	8.5
Exempt, Non-Supervisory	20	12.7	2	6.1	8	14.5	8	13.6
Non-Exempt	20	12.7	7	21.2	6	10.9	4	6.8

Table 32: Staff Assignments by Management Level - 1984
(By Annual Sales/Budget)

Demographically, we found that the "typical" InfoCenter manager is between 35 and 45 years of age who has been with the company between four and seven years but has held the Center management job for less than two. He or she came to the position from the MIS/DP function, and was more likely recruited in-house than hired from outside for the position.

Today, the manager typically has a full-time staff of four to direct (see Appendix Table A.22). They are by and large programmers and data processors at the "Exempt, Non-Supervisory" level. Table 32 shows how respondents are making InfoCenter staff assignments by management level as of the end of 1984.

Our survey questionnaire asked if InfoCenters had developed a standard staff/end-user ratio. Only 14 respondents answered that they have set such a ratio, and the range varied from under 40:1 to over 100:1. The number of end-users served is less important to staffing decisions than the amount and type of assistance those end-users request.

As we will discuss in the following chapter, Information Center managers and staffers worry little about power and control issues. Their true concern is end-user support and effective performance. Our interviews and survey results introduced us to a group of professionals with an admirable dedication to their mission.

7.

AT THE SCREEN: FOCUS ON END-USERS

Every Information Center serves a unique clientele. End-user numbers and needs provide the basis for decisions on more than InfoCenter staffing and budgets. The hardware and software the Center supports and the evaluations, authorizations and training it provides are all determined by nature of the end-user community.

We looked at this community from without and within. Our main questionnaire asked Information Center managers how many clients they served, how many requests for assistance they fielded in 1984, and what source these requests had, by both function and management level. Our short questionnaire, distributed directly to end-users, sought information on available computing tools and the amount of use they received.

Because each Center exists in its own environmental mix of mainframe and micro end-users, the latter further divided into linked and standalone machines, there is no realistic way to give a numerically "typical" end-user community. The figures in Table 34 on the following page show the totality, broken out by company size.

A request for assistance may be filled in minutes (access to data, for example) or may require months (creating special applications software). As we have seen, the largest share of requests in 1984 was for microcomputer hardware and software training, or for evaluations. A majority of Centers of any size received fewer than 500 requests in 1984, but the trend is upward, as Table 33 below indicates.

INFOCENTER RESPONDENTS (Sample: 158; Total inc. 11 not giving ann. sales) End-User Requests	Total IC's		Annual Sales: Below $50M		$50M-$500M		Above $500M	
	1st yr. '84		1st yr. '84		1st yr. '84		1st yr. '84	
1-100	75	50	22	20	22	14	24	12
100-500	39	48	8	9	15	16	15	20
Over 500	26	40	2	2	10	17	12	18
Don't know	18	20	1	2	8	8	8	9

Table 33. Number of End-User Requests: Start-Up & 1984
(By Annual Sales/Budget)

INFOCENTER RESPONDENTS (Sample: 147) End-User Clients - 1984	Number of End-Users IC Supports	Annual Sales: Below $50M #	Below $50M Pct.	$50M - $500M #	$50M - $500M Pct.	Above $500M #	Above $500M Pct.
STANDALONE MICRO CLIENTS	0	9	33.3	8	21.8	6	18.6
	1-25	17	51.5	19	34.5	13	33.9
	26-50	3	6.1	14	20.0	2	16.9
	51-100	1	6.1	6	10.9	18	16.9
	101-200	2	0.0	4	0.0	7	6.8
	Over 200	1	0.0	4	5.5	11	1.7
"LINKED" MICRO CLIENTS	0	16	54.5	22	38.2	15	40.0
	1-25	14	42.4	21	43.6	28	40.7
	26-50	1	3.0	7	7.3	7	6.8
	51-100	0	0.0	5	7.3	5	5.1
	101-200	1	0.0	0	0.0	3	6.8
	Over 200	1	0.0	0	3.6	1	0.0
MAINFRAME CLIENTS	0	7	30.3	7	23.6	7	22.0
	1-25	9	39.4	10	16.4	8	18.6
	26-50	10	18.2	7	21.8	5	11.9
	51-100	4	6.1	11	14.5	9	16.9
	101-200	1	0.0	8	10.9	4	5.1
	Over 200	2	6.1	12	12.7	26	27.1

Table 34. End-User Clients Served by Information Centers - 1984
(By Annual Sales/Budget)

The requests fielded by our respondent InfoCenters in 1984 came in equal ratio from middle managers (27.9 per cent), supervisors (25.8 per cent, and non-supervisory personnel (24.8%). Just 12 per cent came from senior managers -- there are, of course, fewer senior managers -- and only 8.9 per cent from non-exempt levels.

In functional area, Finance was the leader, as Table 35 shows.

INFOCENTER RESPONDENTS
(Sample: 158)

25.9%	Finance	13.7%	Sales	2.8%	Purchasing
14.0%	Corporate	9.1%	MIS/DP	6.6%	Office Systems
14.0%	Administration	5.7%	Human Resources	8.2%	Others

Table 35. Origin of 1984 End-User Requests by Function

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CLOSE-UP: ENGINEERING USAGES

An outstanding example of "others" from the preceding table is a mid-sized industrial manufacturing company which, through its Information Center, brought computer power to its engineering division.

In the InfoCenter's inaugural year, with requests for assistance averaging 10 per week, no less than 40 per cent came from the engineering department. A year later, engineering's share of requests had increased to 55 per cent, and more than half the end-users dealing with the InfoCenter in 1984 were engineers. Although none of the five InfoCenter staffers had engineering experience -- two were trainers, three were computer specialists -- they nonetheless took on all training duties, and their manager rated "better training procedures" highest among the benefits realized from the InfoCenter, closely followed by "increased end-user productivity."

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Information Centers bring computer power to end-users. How much use do these end-users make of these computing tools? How many personal computers gather cobwebs? Through AMA's Center for Management Development, we gathered an end-user sample and quizzed them on the subject. Our findings dispute the accepted wisdom that a lot of very expensive electronics may be sitting idle in American offices -- wisdom dispensed by Management Science, Inc., an Atlanta-based software house, after conducting a 1984 survey. Their research, asserting that on the average a microcomputer is used less than one hour per week, stirred considerable hubbub about utilization (Industry Week, June 11, 1984). A piece of equipment costing between $3,000 and $5,000 should be more than decorative, and the less-than-an-hour statistic may have given more than one CEO pause -- especially if an order for a large number of machines awaited his signature.

The Management Science finding poses questions for the Information Center community, and for the whole information technology industry. Is it worth all the effort expended by technicians and trainers, not to mention advertisers and promoters, if it results in a tool that fails to pay for its place on office desktops?

Yet the less-than-an-hour statistic is highly misleading; it focuses on the tool, not the manager who uses it. The approaches are different. For the former, one would count the number of computers on premises, then divide by the number of hours they are in use. For the latter -- the approach AMA used in designing and analyzing its short questionnaire -- one would count the number of managers with access to personal computers, then average their hours per week at the machine.

No doubt some companies, victims of vendor overkill, have put their personal computers in the closet -- or placed them so inappropriately that they might as well be in the closet.

To set the record straight, our staff went at the issue from the second perspective. The objective: to determine how many hours per week a manager with access to a personal computer actually spent computing. The results from our questionnaire,* given to more than 1,000 AMA seminar attendees in December 1984 and January-February 1985, provide a more accurate reading of actual computer usage by working managers. Moreover, the results point toward a basic turnaround in attitudes among MIS/DP professionals vis-a-vis the whole issue of end-user computing.

This second finding, running counter to conventional wisdom, strikes at the foundation of information management. The majority of MIS/DP professionals have joined the microcomputer bandwagon. No longer do they see the concept as a threat, nor do they believe that information processing should be left solely to the dta processing professionals. In throwing their support behind end-user computing, these MIS/DP pros are likely to give a new twist to the direction of personal computer applications.

The discovery of this changeover was unexpected but not overly surprising. During the past few years, our contacts with AMA seminar leaders and members of the AMA Information Systems Council put us in touch with a large number of MIS/DP professionals -- heads of their departments at leading companies -- who championed the idea of end-user computing. Four years ago they may have been voices in the wilderness, bumping heads with MIS managers who saw in their vision a threat to the proper order of things.

Our recent survey sets the record straight on two counts, the "use" issue and the stereotypical notion of the MIS/DP professional as dead set against end-user computing.

In Search of the "Hour-A-Week" Computer

A first tabulation of 951 short questionnaires (the number of usable returns) produced a startling figure: these managers were using their computers, on average, just under six hours per week. Realizing that the sample drew a disproportionate number of MIS and financial managers, we ran the data through our own microcomputer a second time. On this round, we excluded all MIS and financial respondents, as well as 22 clerical workers. We were left with approximately 500 managers in a variety of functions. Virtually all were middle level or higher.

*Charts displaying the results may be found in Appendix B of this report.

One-third of these respondents used their machines less than one hour a week. Eighteen per cent used them 1 to 2 hours; 19 per cent, 3 to 5 hours; 13 per cent, 6 to 10 hours; 6 per cent, 11 to 20 hours; and 6 per cent, 20 hours or more.

Obviously, a few managers in every group are heavy computer users, producing an uneven distribution. Thus, you can turn the statistics in a number of ways:

- The mode (single largest group) says that managers use personal computers less than one hour per week.

- The median (midpoint) says that the typical manager falls in the upper limits of the one-to-two hour range.

- The mean (average) comes to over four hours per week -- 4.35 hours, to be exact.

But forget the statistics per se and look at the reality of the situation. Even among our lightest users (the 71 CEOs and the 90 marketing managers), over 15 per cent are computing for more than six hours per week. On the other hand, about half of the CEO's are letting their machines sit idle, or asking others to handle the keyboards.

The type of hardware makes a big difference. People with full-time terminals use them significantly more than do managers with standalones. Those with linked and dial-up pc's fall somewhere between these two. In other words, the easier the access to corporate data, the more likely the machines will be used. It's simply a matter of getting useful, up-to-date information -- helping to explain the trend towards linked microcomputers and smart terminals.

No matter how long a manager uses a computer, the investment has to have some kind of payoff. Because cost justification is such a slippery issue, we went on to ask one write-in question: "Is there any way in which you can measure the amount of time you are saving with personal computing?" We were looking for specific, quantifiable yardsticks -- for example, "Budget preparation that used to take a week is now done in a day and a half." These might well serve as the basis for further research, and they might provide helpful criteria for companies that are struggling with the justification issue.

The questions, however, proved to be extremely difficult for our respondents. Fewer than one in 20 answered at all, and many of these wrote something to

the effect of "The time saving is tremendous." One respondent, the controller of a Fortune 500 corporation, answered with, "I make all of my judgments intuitively — both in measuring efficiency and in financial matters."

A sampling of the responses:

"Time in all financial areas has been cut approximately 50 per cent."

— Small company financial vice president; uses general ledger and integrated software more than 20 hours per week.

"Four basic report formats are generated in five minutes instead of four hours typing at least once weekly."

— Project manager, large construction/engineering firm, uses database management systems, graphics, and word processing three to five hours per week.

"Scheduling takes one hour rather than one day. Bar charts are neat and concise."

— Senior systems analyst for mid-sized company, uses communications, graphics and word processing less than one hour per week.

"At least 50 per cent time savings."

— Small company office manager, uses spreadsheets and word processing more than 20 hours per week.

"Modifying budget items now takes hours rather than days to see bottom line impact to these changes."

— Large company sales manager.

"Various reports done in half the time."

— Large company materials planner.

"No time savings."

— Principal of small company, uses database management systems, spreadsheets, word processing six to ten hours per week.

"Forecasting our lease volume took approximately 10 hours each quarter, a computer application now does it in 10 minutes. Also our finance planning model computes financial statements pro forma and operating ratios for five years in less than one hour if necessary."

— Operations analyst for mid-size company, uses integrated software, communications, graphics, spreadsheets, and word processing 6-10 hours per week.

These statements read more like advertising copy than evaluation criteria. In fact, we won't be surprised if vendors begin to position their consumer magazine promotion around the efficiency and effectiveness issues. These concepts obviously matter to managers. What difference does it make if a microcomputer has over 100, 200, or 500 available software packages? Our typical manager uses three different softwares. What difference do a few microseconds in speed make in a day's work — or a lot of memory that will never be used?

The crux of the matter for these respondents is that end-user computing does save time, and it does lead to better decisons. Both hardware and software vendors would do well to focus more on these concerns.

A Matter of Attitude

Our questionnaire asked respondents to use a five-point scale to indicate agreement or disagreement with four statements:

1. Personal computing creates a tremendous time saving.

2. I don't save time; my improved efficiency is offset by the fact that I do more calculations.

3. I'm a more efficient planner/decision maker with personal computing than without.

4. On the whole, I'd rather leave the computing process to the professionals in data processing.

The objective was to measure the impact of an information center on the managers' attitudes toward computing. If the InfoCenter is doing its job well, managers from InfoCenter companies should give personal computing higher efficiency and effectiveness ratings. It didn't work out that way.

The first statement, on time savings, produced a whopping 4.15 mean on the five-point scale, a consensus seldom uncovered by a Likert scale. The result is beyond "agree," on the side of "strongly agree."

The second statement, designed to mirror the first, attempted to dig at the efficiency issue from another angle. It's like the common word processing trap: time saved in using the technology is often given back in its overuse, as the writer makes corrections, deletions and substitutions not because they must be made, but because they can be made. The same might be true with end-user computing: because the arithmetic is so easy to change. It's tempting to make changes from all possible "what-if" angles. The result: the addicted numbers-cruncher.

This is exactly what does happen for many of our respondents. Theoretically, the first statement -- "Personal computing creates a tremendous time saving" -- should be the inverse of statement two -- "My improved efficiency is offset by the fact that I do more calculations." People who agree strongly with the first should disagree with the second. This didn't happen. In fact, the mean comes out to a 2.29, somewhat closer to "disagree" than "neutral." Yes, computers are seductive. Yes, time savings are offset by numbers crunching.

Statement three, on efficiency of planning and decision making, draws a firm "agree" (a 3.75 mean), but not a "strongly agree." For some respondents, however, making good decisions counted for far more than the time savings element.

The last statement -- "I'd rather leave the computing process to the professionals in data processing" -- produced the most interesting results. The mean came out at 1.85; most respondents disagree, and would rather not leave the computing process to the DP pros. They're happy to have control of the information.

And on the whole, the MIS/DP respondents disagreed just as strongly as the other respondents. A few wrote comments such as "I shouldn't answer this question since I am a DP professional," and left it blank. Ninety-five per cent did answer -- in terms extremely positive.

Some media articles have painted MIS/DP professionals as the "bad guys" in the move towards end-user computing. They wear black hats, load their shotguns to protect corporate data, and see micro's as dangerous enemy weaponry. DP backlog? We'll handle it. End-users with micro's? A nuisance at best, a menace at worst.

It's not true. Perhaps it never was; the media often do an excellent job of inventing villains and perpetuating misconceptions. Perhaps the attitudes have shifted dramatically in recent years.

With the DP community behind end-user computing, dramatic changes may occur. The mushrooming interest in terminal-micro strategies may be one result. Given the expertise DP professionals bring, it's no surprise that some companies will be buying more terminals than microcomputers, with the software coming from the mini or the mainframe.

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END-USER CLOSE-UP: OFF SITE SUPPORT

The headquarters of a large midwestern insurance company supports more off-site microcomputers than on-site units with its Information Center.

Fewer than half of the 200 microcomputers the company purchased in 1984 were placed at headquarters. The greater share went into branch offices, where agents used standalone pc's. Training was delivered by InfoCenter staff or via vendor-supplied materials; the Center had to approve all hardware and software purchases, for both on-site or off-site use.

InfoCenter staffing was especially tailored to end-user needs: the manager's expertise was in "Manual Systems and Procedures," and an insurance claims specialist was one of two other full-timers assigned to the unit. This was one result of an across-the-board needs analysis done prior to start-up; few InfoCenters began with as much input from as many departments. Including a claims expert was right on the mark: seventy per cent of first-year end-user requests had to do with the administrative processing of claims. By 1984, the percentage of administrative end-users had dropped to less than half, while the number in sales had nearly doubled.

Two full-time staffers will be added in 1985, as the unit continues to focus on support of a widely distributed group of standalone pc end-users, who most frequently request instruction in dial-up communications with the home office. In keeping with its mission, the Center rates "increased networking capability" as most important to its future.

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8.

TAPPED OUT IN COMPUTERLAND: INFOCENTERS AND COST CONTROL

Reports of computer expenditures tend to exhaust a printer's supply of zeros. Our sample of 158 Information Center respondents, representing only a fraction of American business, nevertheless spent over four million dollars on new mainframe computers alone in 1984, and thirteen million dollars on microcomputer hardware. Our non-InfoCenter respondents dipped deep into corporate budgets as well: 38 of them combined to spend nearly $16 million for new mainframes, and $5 million more for micro's.

Information Centers help an organization define its computer needs. For that reason they play a role in setting budgets for hardware and software purchases. The point is not whether they increase or decrease corporate spending on information technology, but rather whether they accurately assess end-user needs and therefore allow a company to anticipate future spending, thus controlling costs.

Tables 36 below and 37 on the following page compare not only total expenditures, but the success with which those expenditures were anticipated by InfoCenter and non-InfoCenter respondents.

INFOCENTER RESPONDENTS (Sample: 158)	Made Purchases in 1984		Average Dollars Spent	Expenditure Above Anticipated Level	
	#	Pct.		#	Pct.
Mainframe Expenditures					
New mainframe computer	12	7.6	344,000	4	25.0
Upgraded capability for existing mainframe	21	13.3	175,000	1	4.8
Upgraded storage capacity	25	15.8	73,000	4	16.0
Additional terminals	43	27.2	46,000	9	20.9
New minicomputer	14	8.9	210,000	3	21.4
Applications software	51	32.3	63,000	16	31.3
Micro expenditures					
New microcomputers	97	61.3	134,000	42	43.3
Upgraded capability for existing micro's	34	21.5	32,000	14	43.8
Upgraded storage capacity	23	14.6	19,000	9	39.1
Total micro software	78	49.4	32,000	23	30.3

Table 36. 1984 Computer Expenditures by InfoCenter Respondents

NON-INFOCENTER RESPONDENTS (Sample: 185)	Made Purchases in 1984		Average Dollars Spent	Expenditure Above Anticipated Level	
	#	Pct.		#	Pct.
Mainframe Expenditures					
New mainframe computer	38	7.6	414,000	11	28.9
Upgraded capability for existing mainframe	48	13.3	197,000	10	20.8
Upgraded storage capacity	48	15.8	151,000	15	31.3
Additional terminals	77	27.2	51,000	20	25.9
New minicomputer	24	8.9	139,000	4	16.7
Applications softwre	68	32.3	112,000	15	22.1
Micro expenditures					
New microcomputers	114	61.6	47,000	46	40.4
Upgraded capability for existing micro's	30	16.8	22,000	17	56.7
Upgraded storage capacity	30	16.8	22,000	17	56.7
Total micro software	79	42.7	18,000	24	30.1

Table 37. 1984 Computer Expenditures by Non-InfoCenter Respondents

From this data, we may assert that InfoCenters were generally more successful in anticipating hardware expenditures of any sort for both mainframes and microcomputers. Non-InfoCenter mainframe expenditures were not only larger on the average, but ran over anticipated levels four times as often for upgrading mainframe operational capability and twice as often for increasing mainframe memory. Only in connection with the newest of hardware strategies -- the installation of a minicomputer link -- did non-InfoCenter respondents produce better results than companies with IC's.

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HEY, BIG SPENDER!

Among our respondents, a New York based insurance company took the biggest plunge into microcomputer technology in 1984. The tab was $1,500,000 for hardware -- entirely to IBM -- and $200,000 for software, plus $400,000 upgrading the mainframe to handle the newly linked pc's. The company did not covet the "biggest spender" award; expenditures on new pc's and software were above anticipated levels.

Previously concerned with mainframe technology only, the Information Center had but two staffers, one a computer specialist, the other an administrator. Now the facility was charged with training nearly a thousand pc end-users. Working on the basis of a 60-to-1 ratio of end-users to InfoCenter personnel, the IC manager added 15 people to the staff: 2 supervising managers, 11 programmers and trainers, and 2 clerical administrators.

While others in the corporate MIS/DP operation train end-users in spreadsheet or word processing software, the InfoCenter gives instruction in database management and communications software or the more complex integrated packages (its most requested service). It also designs special applications software for specific jobs.

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Microcomputers are a brave new world to all computer professionals, whether or not they band together on an Information Center staff. Measuring micro capability against cost is a most difficult judgment. What seems sure is that those professionals who are in touch with end-users on a regular basis will be best able to recommend cost-effective hardware and software.

Chargeback Policies

Who pays these costs at Information Center worksites? Half our InfoCenter respondents absorb costs into their own budgets; the others charged various services back to end-user departments. Companies surveyed were divided fairly evenly in categorizing their InfoCenters as cost centers (43.0 per cent) or overhead items (47.5 per cent). Fewer than half the Centers surveyed charged back even such obvious expenditures as hardware and software purchases, and while chargeback practices were more common in larger companies, only 50.8 per cent of these charged back hardware items, and 49.2 per cent software items. Just under 40 per cent of all Information Center respondents had no chargeback policies at all, as Table 38 below displays.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Services Charged Back to End-Users	Total IC's		Annual Sales: Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Hardware purchases	75	47.5	13	39.4	27	49.1	30	50.8
Software purchases	71	44.9	9	27.3	28	50.9	29	49.2
No chargeback policy	63	39.9	13	39.4	20	36.4	24	40.7
Installation/hookup/interface costs	36	22.8	8	24.2	12	21.8	14	23.7
Data storage costs	32	20.3	7	21.2	8	14.5	16	27.1
Time connected to mainframe	29	18.4	5	15.2	9	16.4	14	23.7
Maintenance/repair	26	16.5	4	12.1	8	14.5	10	16.9
Creating systems applic. software	25	15.8	5	15.2	6	10.9	14	23.7
Overhead	20	12.7	5	15.2	6	10.9	8	13.6
Consultation time	18	11.4	5	15.2	4	7.3	9	15.3
Training time	13	8.2	3	9.1	3	5.5	7	11.9
Other	7	4.4	1	3.0	4	7.3	2	3.4

Table 38. Information Center Chargeback Policies

In no category did Information Center chargeback policies differ significantly from those practiced by non-InfoCenter MIS/DP divisions. Twice as many non-InfoCenter shops charged maintenance and repair costs to other departmental budgets, but even there the actual figure was 16.5 per cent of IC worksites, 30.8 per cent of non-IC sites. The same two-to-one ratio existed for training time, but the actual practice was even more rare: 8.2 per cent of InfoCenter locations, 15.1 per cent of non-IC shops. Comparison of chargeback policies for all other services showed neither significant patterns nor major differences.

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CASE STUDY: CHARGEBACK POLICIES

A major steel producer caught "pc fever" in 1984, but a mature Information Center, in place since 1980, was ready to deal with the onslaught — aided by the most complete chargeback system our survey discovered.

Bringing nearly 200 personal computers into corporate headquarters (worksite population: 2,000) might have swamped the MIS/DP operation, had not the InfoCenter been ready with a full-time staff of 8 (plus 5 additional part-timers), a wealth of training experience, and a chargeback system as complete as any in the nation. The expertise acquired in four years of training and supporting mainframe end-users was put to work to field over 10,000 requests for help as diverse as training in word processing software, installing mainframe links and communicating with on-line databases.

The range of departments requesting assistance was equally large: 1 in 10 end-user requests came from the corporate staff, 1 in 4 from finance, 1 in 7 from human resources; sales and administration also called in, and 25 per cent of all requests came from "other" departments (not including MIS itself). An accounting nightmare might have ensued without the chargeback system, complete to rates of $35 an hour for consultation, training time, or hours spent creating special applications software. A carryover policy from an in-house timesharing system allowed chargebacks for time connected to mainframe and data storage costs. Even the InfoCenter's own overhead was charged back to end-user budgets.

Upwards of 200 additional microcomputers will come on board in 1985, and an equal number of mainframe terminals will be added; moreover, 1 in 5 current pc end-users will upgrade their hardware this year. The increase will occur despite the Center's tight controlling policy on both hardware and software purchases: justification forms, including a forecast of a minimum dollar savings or productivity increase, must pass the InfoCenter staff before new materials can be bought.

The Center anticipates handling the extra load without increasing its staff; it will recommend more training by self-instruction, and will continue its frequent use of computer-based training. High on the manager's wish list is increased uploading and downloading capability: what end-users can do for themselves, the hard-worked Center staff will no longer have to do for them.

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In discussing expenditures and cost-control, the bottom line is no metaphor, but an actual dollar figure. Information Centers receive most credit for increasing end-user productivity; 81.7% of our respondents rate this "most significant" among benefits realized from InfoCenter operations. That has its effect on the bottom line. More than half our respondents include increased cost-effectiveness of both hardware and software as similarly significant benefits. Information Centers demonstrably control costs and contribute to worker productivity.

9.

SUNRISE OR SUNSET? THE FUTURE OF THE INFORMATION CENTER

The immediate future holds nothing but promise for Information Centers, but the long term may prove them temporary phenomena that will fade as information technology moves into a new dimension, to serve a new generation of end-users.

For 1985, the outlook is bullish. Of our respondents, 88 per cent will serve a larger clientele than in 1984, and for some the increase will be phenomenal: almost a third will serve more than 200 new mainframe end-users, and 25 per cent more than 200 new micro end-users. Our respondents alone will authorize the purchase of more than 6,000 new microcomputers and 7,500 new mainframe terminals. Additional thousands will be spent to upgrade present hardware.

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CLOSE-UP: A TURN TOWARDS TERMINALS

Large companies will purchase terminals at a more accellerated rate than microcomputers in 1985 and likely beyond. This finding, contrary to many industry predictions, relates directly to the growing number of InfoCenter managers who see terminal/minicomputer/mainframe links as the way of the future.

A round of telephone interviews to check this finding discovered that cost, data security, and easier access were important motivating forces. "The terminal we've adopted as our standard costs $500," said one interview subject -- a fraction of the cost of a similarly adept microcomputer.

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More senior manager end-users, more middle managers, more end-users in manufacturing divisions, in administration, in advertising, public relations and marketing; 9 respondents in 10 see increases everywhere. To deal with them, many will add staff -- more than half of all large and mid-sized company InfoCenters have plans to do so -- and by year's end respondent mean staff levels will jump to 6.1 from 1984's 4.2. Thirty per cent will use more in-house training, 25 per cent more computer-based training. Everything begins with the word, "More!"

But there are whispers and worries. The greatest anxiety stems from the simple need to keep up with technological advances. Is the company's installed base positioned to accept the new and better products on the horizon? Will the new machines be simpler as well as bigger and faster? "When are those guys [the vendors] going to quit making machines that run faster and start making them easier to use?" asked one InfoCenter manager. "There's little excuse for this backward priority." "Vendors cease manufacturing spare parts to support the product while we're still using it; software vendors don't upgrade their products in step with hardware changes," said another.

"When I buy, say, 200 machines," said yet another, "I want the vendor to hold my hand when I open the crates and start hooking them up. And if not that, then I want the vendor to be reachable by phone. At the moment, I'm getting neither from IBM."

All this leads to minds divided about the future. InfoCenter managers are eager to expand their programs, worried about their ability to do so. They want time to catch up with the latest technological breakthroughs, and are at the same time demanding new products -- better software for mainframe hookups and local area networking, to name two most frequently mentioned on the "wish list" portion of our questionnaire. Simultaneously, the eagerness for the new is conditioned by the fear, "Will the vendor support be there when the right products arrive in the marketplace?"

"What single hardware product not currently on the market would you most like to see in the future?" we asked both our questionnaire respondents and our interview subjects. The answers suggest that Information Center managers are very much concerned about printer technology; that they're willing and poised to start local area networks (LANs); and that others innovations, such as truly portable equipment, are in great demand. To quote them, first on printers:

"Reliable line printer for microcomputers."
"Letter quality high-speed printer at reasonable cost."
"A combined letter quality and graphics printer."
"A good laser printer."

On local area networks:

"A true IBM compatible LAN."
"LAN for IBM and Apple.
"High-speed, low-cost IBM compatible LAN.

On portability:

"Fully portable lap-top pc."
"True portable (20 lbs.)"
"15 lb. portable"
briefcase portable (TRS-100 size) compatibility with PC Net"
"Really portable (10 lb.) IBM compatible with full, legible screen."

To which the vendors, in all fairness, have the right to respond, "Will that be strawberry or vanilla?"

Matters of Control

"We have to be realistic enough to face the loss of traditional DP controls," admitted one InfoCenter manager. "Our job now is to manage in such a way as to minimize the pitfalls."

This statement came in response to our question, "In the long run, how can management best control end-user computing?" Along with a host of similar responses, it signals an abrupt about-face among those charged with guarding the integrity of corporate data, and sets the stage for a surprisingly flexible and creative approach to control.

Asking the question, we anticipated calls for clear guidelines on access to privileged data and more rigid chargeback systems. We found instead a group of realists. "You can't control it at all," one said. "You educate the end-users, and they will manage themselves. We allow the 'stages of growth' to take their course. In the end, the managers using the equipment will request control -- which is far better than having corporate management force control, at the cost of lost productivity."

"Support equals control," said another. "True, as user skills grow, this may not always be the case. For the moment, it is." And a third answered, "We are not looking to control to the point of making the acquisition of a pc a major effort. Based on our measurement of productivity increases, we are encouraging our staff to request [microcomputers]."

InfoCenter managers clearly see themselves in a supporting, rather than a controlling, role. "The right kind of support creates its own control" was a sentiment echoed time and again. Not that all our respondents were of one mind; many talked of the importance of cost/benefit analysis, justification policies, standards, guidelines, audits, passwords, encryption, and the like. One East Coast transportation firm controls mainframe data by maintaining a separate mainframe for end-users only; sensitive or privileged data simply doesn't go on that mainframe.

The respondents who thought that "centralized control" was the key to controlling end-user computing, however, were clearly in the minority. Many who talked about standards and policies were quick to merge their comments with the magic word, "support." "We're centralizing control under the MIS department, but without stifling end-user autonomy," went a typical response. "We do this by being supportive and involved as well as providing technical leadership."

Sunset?

Two factors will determine how permanent a place Information Centers earn in the corporate environment. The first factor is in their own hands: how well will they fill the needs they were established to meet? The second will be determined by forces outside their control: the changing nature of the technology they direct and the end-user community they serve.

We have made frequent reference to "significant benefits realized" from Information Center activities. Table 39 displays how InfoCenter managers themselves rate these benefits. Our questionnaire offered a 1-to-5 scale; Table 39 lists what percentage of respondents rated the listed benefits 4 or 5.

INFOCENTER RESPONDENTS (Sample: 158; Total includes 11 not giving annual sales) Benefits Realized	Total ICs		Annual Sales: Below $50M		$50M - $500M		Above $500M	
	#	Pct.	#	Pct.	#	Pct.	#	Pct.
Increased end user productivity	129	81.7	23	69.7	48	87.3	49	83.0
Increased standardization of micro hardware	99	62.9	17	51.5	32	58.2	42	71.2
Increased cost-effectiveness: hardware	89	56.3	19	57.6	31	56.4	33	60.0
Increased cost-effectiveness: software	81	51.3	18	54.5	27	49.1	31	52.5
Increased micro/mainframe compatibility	79	50.0	9	27.3	28	50.9	34	61.8
Better training procedures	77	48.8	14	42.4	27	49.1	33	55.9
Lessened DP backlog	44	27.8	10	30.3	22	40.0	10	16.9

Table 39. Significant Benefits Realized from Information Centers (By Annual Sales/Budget)

The instructive comparison is with Table 21 on page 36 above. That table displays why organizations wanted InfoCenters; Table 39 shows the results these units have achieved. Highest on the first list was "Training in software use," rated significant by nearly 60 per cent of our respondents; but the result, "Better training procedures," is near the bottom on Table 39. "easing DP backlog" was the major concern of nearly half the Centers at start-up; just over a quarter of them have significantly done the job.

That important benefits do indeed accrue from Information Centers is demonstrated in the table above. When four out of five respondents credit the unit with increasing end-user productivity to a significant degree, InfoCenter staffs have reason to be proud. When more than half are recognized to have increased the cost-effectiveness of information technology, they have made an important contribution to corporate overhead.

The fact remains that while most InfoCenters train, training benefits are not greatly realized; and DP backlog remains a major problem. We have suggested earlier that an increase in the presence of professional trainers may ameliorate the training problem, and that in any case the difficulty is so immediately traceable to the immensity of the task that any effort is bound to fall short. As to the second point, InfoCenter managers with whom we talked pointed in turn to vendors.

"There are tools looming on the horizon that could potentially ease that backlog, mainly software that would enable users to build their own on-line query database software," says a systems project leader who manages a six-person InfoCenter staff at an Illinois power company. "But we're very hesitant to allow that or to purchase it. We consider the cost to be prohibitive. [Think about] the impact something like that would have on the mainframe, the lack of control the corporation would have over data creation and management . . . our users haven't become sophisticated enough to ask for what could be used [in] mainframe software."

What begins as a plea to vendors ends as a description of end-user naivete. The fact remains that computer technology is brand new, and that most end-users are computer naive. The training problem will inevitably diminish as a computer-literate generation comes into organizations and takes charge of a new generation of technology, truly easier to learn and easier to use.

That in itself may signal the beginning of the end for Information Centers . . . or certainly the end of the beginning. There was a time, not so very long ago, when organizations trained people to type. Few do so today; the skill is learned at home, in school, or at special vocational training institutions, and corporate "Typewriter Training Centers" are extinct.

Computer technology that is simpler to use than today's instruments will require less direct training; technology more complex, like much of the latest generation of microcomputers, are not end-user technology at all, but instead require professional expertise -- the "windowing" experience repeated in hardware. The products may pretend to be user-friendly, says a New York-based information technology consultant, "but in fact, in order to use them properly, you practically need a programmer or somebody with some systems knowledge . . . More and more of this is happening."

Evaluations will be less necessary as companies make long-range decisions on the hardware and software they will buy and use. That, combined with lower prices, may make purchase authorizations a lesser issue. Standardization will narrow choices. Off-the-shelf hardware will lower demand for specially created software. As discussed, the need for training will diminish. These are the primary functions of an Information Center. In 1985 the curve is upward. It may well peak before the decade is out.

10.

METHODOLOGY

Two basic instruments were used to collect data for this report.

The first was an extended questionnaire on management and costs of end-user computing in organizations with and without Information Centers. Printed on 12 legal-sized pages, it requested data in 62 discrete areas of inquiry from Information Center managers. It featured a separate section for MIS/DP managers whose organizations lacked Information Centers, requesting data in 23 areas of inquiry from them. This questionnaire mailed to 7,500 targeted respondents in mid-January 1985. Lists included MIS/DP vice-presidents of approximately 3,000 companies whose employees attended AMA seminars in Information Systems and Technology (IST) in 1983 and 1984, and 4,419 selected members of the Data Processing Management Association. With responses cut off on February 8, 1985, three weeks after the mailing date, AMA received 343 usable questionnaires to create its statistical sample. Questionnaires received after the cut-off date were culled for profile information for this report, but are not part of the statistical base.

The second instrument was a short questionnaire on end-user computing which sought information directly from end-users. It requested data in nine discrete areas of inquiry from all respondents. This questionnaire was submitted to 1,200 managers attending American Management Association seminars in General Management, Finance, and Information Systems and Technology in December 1984 and January 1985. One hundred potential respondents attending the AMA Comptency Development Laboratory also received this short questionnaire. Nine hundred and fifty-three usable responses were received and made part of the statistical base of this report.

The AMA Briefings and Surveys staff also conducted over 100 extended telephone interviews with Information Center managers in every region of the country. Members of AMA's Council on Information Systems and Technology were consulted. Our staff made a number of on-site visits to Information Centers in the New York metropolitan area. Two roundtable discussions were organized under AMA auspices. The first was held in Boston in August 1984, with vendors of microcomputer hardware and software participating. For their help in this effort, we express our appreciation to Warren/Weingarten Publications of Boston, sponsors of the 1984 Information Center Conference and Exposition and publishers of Information Center Magazine. The second roundtable was held in New York in November 1984, for Information Center managers.

APPENDICES

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APPENDIX A: Explanation of Charts

This Appendix presents data obtained from key questions of the major questionnaire distributed to Information Center and MIS/DP managers. The charts feature a more detailed statistical presentation of the survey results discussed in the body of the report; some look at an issue from a slightly different perspective. The appendix is organized as follows:

Tables A.1. to A.12.	Start-up issues: hardware strategies, planning, staffing, and costs.
Tables A.13. to A.17.	Operations in calendar 1984: hardware and software expenditures, number of computers on premises, end-user requests, etc.
Tables A.18. to A.23.	Current operations: number of computers on premises, end-users served, staff levels, etc. "Current" refers to January/February 1985, when data was collected.
Tables A.24 to A.33.	Anticipated 1985 operations: number of hardware units to be purchased, end-users to be served, etc. Also presented here is information on the criteria used to evaluate hardware and software.

Many of the tables cross-tabulate responses with information on annual revenues or budget. Because our respondents were predominately from larger organizations, some of the smaller-revenue categories contain a limited number of responses and may not be representative of such organizations in general.

Table A.1.

WHY COMPANIES STARTED INFORMATION CENTERS

Respondents used a five-point scale to rate the importance of 17 factors in terms of the weight each carried in the decision to create an information center. The table shows mean scores. (The higher the score, the greater the importance.) A number of patterns are somewhat predictable. Note, for example, that standardizing PC hardware and software claim greater importance in the larger companies.

Overall, the easing of DP backlogs came in as a surprisingly low priority. Note, however, that some of the larger midsized companies made this a matter of importance. Four other factors (not shown on the table) rated less than a 3, on average. These included monitoring access to corporate data, protecting security of corporate data, providing an in-house hotline, and directing an in-house computer store.

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Training in software use	3.82	3.88	3.71	2.67	3.50	4.08	3.82	3.95	3.82
Improve DP/end-user relations	3.72	3.69	2.57	2.86	3.89	4.00	4.00	3.95	3.82
Training in computer use	3.72	3.57	3.71	2.50	3.50	3.69	3.86	3.81	3.71
Assist in software selection	3.67	3.53	4.00	2.83	3.50	3.31	3.46	3.95	3.77
Provide access to corp. data	3.64	3.35	4.00	3.00	4.22	3.46	3.70	3.75	3.38
Standardize hardware	3.58	2.00	3.57	2.80	3.00	3.15	3.86	3.90	3.92
Monitor software purchases	3.37	3.07	3.86	3.50	2.89	3.15	3.54	3.40	3.21
Insure pc/mainframe compat.	3.35	2.62	3.43	1.40	2.89	3.38	3.41	3.85	3.57
Standardize pc software	3.35	2.47	3.29	2.40	2.60	3.15	3.61	3.80	3.50
Monitor pc purchases	3.33	2.33	3.14	2.80	2.60	2.85	3.75	3.55	3.69
Assist in selection of pc's	3.32	2.59	2.86	1.80	2.90	2.77	3.62	3.75	3.66
Ease DP backlog	3.32	3.06	3.14	2.71	4.00	3.50	3.82	2.70	3.26
Supervise pc/mainframe links	3.22	2.00	2.71	1.40	2.56	3.46	3.62	3.50	3.55

Table A.2.

THE GREATEST IMPLEMENTATION OF NEW INFORMATION CENTERS CAME IN 1983 AND 1984

(Percentage of companies that started infocenters in each of seven start-date categories)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Prior to 1979	5.1	15.8	14.3	0.0	0.0	7.7	3.2	0.0	0.0
1979	.6	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	5.7	5.3	14.3	0.0	9.1	0.0	9.7	0.0	7.9
1981	7.0	10.5	0.0	28.6	18.2	7.7	0.0	0.0	10.5
1982	13.9	10.5	14.3	28.6	9.1	7.7	9.7	19.0	15.8
1983	29.1	31.6	14.3	14.3	27.3	46.2	25.8	28.6	28.9
1984	32.3	15.8	42.9	14.3	27.3	15.4	41.9	52.4	31.6
Don't know/no answer	6.3	5.3	0.0	14.3	9.1	15.4	9.7	0.0	5.3

Although "information center" seems to be a big-company concept, the idea caught fire first in smaller organizations.

Table A.3.

THE DIVERSITY OF HARDWARE STRATEGIES
INCREASES AFTER THE INFOCENTER IS IMPLEMENTED

(Percentage of respondents adding or dropping* one of the seven strategies)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Dropped in-house timesharing/ remote computer services	15.8	26.3	14.3	28.6	9.1	0.0	25.8	4.8	15.8
Added base: have information center assisting end-users in computer applications	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Added in-house timesharing/ remote computer services	10.1	10.5	14.3	0.0	9.1	7.7	6.5	14.3	7.9
Added distributed facilities mainframe workstations	17.7	10.5	28.6	42.9	27.3	15.4	12.9	19.0	15.8
Added distributed facilities pc's linked to mainframe	48.7	15.8	71.4	28.6	18.2	23.1	58.1	66.7	55.3
Added distributed facilities dumb terminals linked to a minicomputer, linked in turn to the mainframe	8.9	5.3	14.3	14.3	9.1	0.0	9.7	4.8	10.5
Added local facilities: stand alone systems serving a particular function or group	24.7	36.8	42.9	14.3	9.1	23.1	22.6	19.0	26.3
Added independent facilities standalone pc's	46.2	36.8	42.9	28.6	27.3	53.8	45.2	42.9	55.3
Other added	2.5	5.3	14.3	14.3	0.0	0.0	3.2	0.0	0.0
Don't know/no answer	23.4	26.3	0.0	28.6	45.5	30.8	25.8	19.0	23.7

*The table does not show that 2 percent dropped distributed facilities, 1 percent dropped distributed facilities/dumb terminals linked to mainframe, 2 percent dropped group/standalone facilities, and 2.5 percent dropped standalone pc's.

Table A.4.

ABOUT HALF OF THE COMPANIES STUDIED CONDUCTED A NEEDS ANALYSIS PRIOR TO INFORMATION CENTER FORMATION

(Percentage of companies that did or did not conduct such a study)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Yes	46.8	47.4	71.4	71.4	54.5	53.8	41.9	38.1	42.1
No	50.6	52.6	28.6	28.6	36.4	46.2	54.8	61.9	52.6
Don't know/no answer	2.5	0.0	0.0	0.0	9.1	0.0	3.2	0.0	5.3

Midsized companies are most likely to do a needs analysis. Much has been said and written about the importance of a "needs and wants" study prior to formation of final plans. The idea makes sense. Why have so few firms done such a study?

Table A.5.

OVER 70 PERCENT OF INFORMATION CENTER MANAGERS COME FROM AN MIS/DP BACKGROUND

(Percentage of respondents checking each of four categories)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Corporate	12.0	26.3	28.6	14.3	0.0	15.4	3.2	19.0	2.6
MIS/DP	71.5	57.9	71.4	57.1	72.7	46.2	80.6	71.4	84.2
Finance	10.1	0.0	0.0	0.0	18.2	15.4	6.5	9.5	7.9
Sales	6.3	0.0	0.0	0.0	9.1	15.4	6.5	4.8	5.3
Human resources	1.9	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0
Purchasing	6.3	10.5	14.3	0.0	0.0	15.4	6.5	4.8	5.3
All other	7.0	0.0	0.0	0.0	9.0	7.0	0.0	4.8	2.6
None/no answer	6.3	5.3	14.3	28.6	9.1	15.4	6.5	0.0	2.6

And less than 3 percent, overall, come from a human resources/training area.

Table A.6.

HOW MANY PEOPLE DOES IT TAKE TO START AN INFORMATION CENTER?

(Average number of staff at start-up)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Full-time	3.9	3.5	4.8	5.3	3.8	4.0	3.1	3.1	4.8
Part-time	1.8	2.8	0.0	1.7	1.0	1.3	1.4	1.8	2.0

Table A.7.

HARDWARE EXPENDITURES AT START-UP

(Average dollar expenditures, 000 omitted)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
New mainframe	388	75	450	125	750	175	650	750	62
Added storage	96	23	160	25	275	36	120	47	0
Mainframe terminals added	43	10	177	20	84	5	66	53	17
Minicomputers	94	79	295	108	50	0	59	38	77
Courtesy pc's	41	21	111	15	75	58	29	63	24
Other	81	3	0	39	0	22	400	0	39

Table A.8.

OVER 70 PERCENT STAYED WITHIN BUDGET FOR STARTUP HARDWARE

(Percentage of respondents checking each of three categories)

		ANNUAL SALES							
Expenditures were . . .	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Above anticipated levels	9.5	31.6	42.9	28.6	0.0	7.7	3.2	0.0	2.6
At or about anticipated levels	72.8	52.6	57.1	57.1	81.8	76.9	77.4	90.5	71.1
Under anticipated levels	8.2	10.5	0.0	14.3	0.0	0.0	3.2	9.5	15.8
Don't know/no answer	9.5	5.3	0.0	0.0	18.2	15.4	16.1	0.0	10.5

Table A.9.

EVEN THE LARGEST ORGANIZATIONS REPORTED 10 OR FEWER PERSONAL COMPUTERS ON PREMISES WHEN THE INFORMATION CENTER STARTED

(Percentage of respondents checking each of six number categories)

		ANNUAL SALES							
Number of pc's	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	64.6	68.4	57.1	85.7	54.5	84.6	48.4	61.9	68.4
11-25	13.3	10.5	28.6	0.0	0.0	7.7	16.1	28.6	7.9
26-50	7.0	0.0	0.0	0.0	9.1	7.7	16.1	4.8	7.9
51-100	1.9	0.0	0.0	0.0	0.0	0.0	3.2	4.8	2.6
101-200	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
More than 200	0.6	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
None/no answer	12.0	21.1	14.3	14.3	36.4	0.0	12.9	0.0	10.5

Table A.10.

NUMBER OF END-USERS NEW UNIT WAS DESIGNED TO SERVE:
MAINFRAME TERMINAL END-USERS

(Percentage of respondents checking each of six categories)

		ANNUAL SALES							
Number of users	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	12.0	26.3	0.0	0.0	0.0	7.7	9.7	4.8	18.4
11-25	11.4	15.8	42.9	28.6	18.2	0.0	9.7	4.8	5.3
26-50	15.8	5.3	28.6	42.9	36.4	30.8	12.9	19.0	7.9
51-100	12.7	0.0	14.3	14.3	9.1	15.4	16.1	19.0	13.2
101-200	5.7	0.0	0.0	0.0	9.1	15.4	9.7	4.8	5.3
More than 200	16.5	5.3	14.3	0.0	9.1	15.4	12.9	23.8	28.9
None/no answer	25.9	47.4	0.0	14.3	18.2	15.4	29.0	23.8	21.1

Table A.11.

NUMBER OF END-USERS NEW UNIT WAS DESIGNED TO SERVE:
STANDALONE PC END-USERS

(Percentage of respondents checking each of six categories)

		ANNUAL SALES							
Number of users	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	20.9	47.4	42.9	28.6	9.1	23.1	12.9	9.5	21.1
11-25	16.5	10.5	0.0	14.3	27.3	7.7	22.6	23.8	13.2
26-50	15.8	5.3	14.3	0.0	0.0	30.8	22.6	19.0	15.8
51-100	12.0	5.3	0.0	14.3	0.0	0.0	19.4	14.3	18.4
101-200	8.2	0.0	14.3	0.0	18.2	7.7	3.2	4.8	15.8
More than 200	3.8	0.0	0.0	0.0	0.0	7.7	6.5	0.0	2.6
None/no answer	22.8	31.6	28.6	42.9	45.5	23.1	12.9	28.6	13.2

Table A.12.

NUMBER OF END-USERS NEW UNIT WAS DESIGNED TO SERVE:
PC LINKED TO MAINFRAME END-USERS

(Percentage of respondents checking each of six categories)

		ANNUAL SALES							
Number of users	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	34.2	36.8	42.9	57.1	27.3	30.8	35.5	23.8	36.8
11-25	8.2	0.0	0.0	0.0	9.1	7.7	12.9	9.5	7.9
26-50	5.7	0.0	0.0	0.0	0.0	15.4	6.5	4.8	7.9
51-100	5.1	0.0	0.0	0.0	0.0	0.0	12.9	4.8	5.3
101-200	2.5	0.0	0.0	0.0	0.0	0.0	0.0	14.3	2.6
More than 200	1.9	0.0	0.0	0.0	9.1	0.0	3.2	0.0	0.0
None/no answer	42.4	63.2	42.9	42.9	54.5	46.2	29.0	42.9	39.5

Table A.13.

NUMBER OF PERSONAL COMPUTERS PURCHASED IN 1984

(Percentage of respondents purchasing 1 to 10 pc's, 11 to 25 pc's, and so on)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	31.0	63.2	57.1	57.1	18.2	53.8	25.8	19.0	15.8
11-25	22.8	15.8	0.0	14.3	45.5	23.1	32.3	19.0	23.7
26-50	15.8	0.0	0.0	0.0	9.1	7.7	16.1	38.1	13.2
51-100	10.8	0.0	0.0	0.0	0.0	15.4	9.7	19.0	15.8
101-200	4.4	0.0	28.6	0.0	9.1	0.0	3.2	0.0	7.9
More than 200	4.4	0.0	0.0	0.0	0.0	0.0	3.2	0.0	15.8
None/no answer	10.8	21.1	14.3	28.6	18.2	0.0	9.7	4.8	7.9

Table A.14.

1984 HARDWARE EXPENSES

(Average dollar expenditures, 000 omitted)

		ANNUAL SALES							
	ALL RESPONDENTS	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
New mainframe computer	344	128	250	60	0	0	485	650	234
Upgraded operational capacity, mainframe	175	260	10	74	0	92	63	299	177
Upgraded storage capacity, mainframe	73	49	50	21	0	39	90	85	99
Added terminals	46	38	30	44	50	22	90	77	40
New minicomputer(s)	210	54	20	24	145	500	700	150	355
New pc's	134	24	132	39	123	69	123	201	214
Upgraded operational capacity, pc's	32	0	50	1	9	18	10	17	70
Upgraded storage cap., pc's	19	2	6	0	13	9	14	21	24

Table A.15.

1984 SOFTWARE EXPENSES

(Average dollar expenditures, 000 omitted)

		ANNUAL SALES							
	ALL RESPOND-ENTS	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Applications, mainframe	63	15	7	1	75	37	92	84	36
Personal computers									
Database management	12	3	4	108	3	3	6	12	5
Spreadsheets	11	2	8	27	23	24	9	14	11
General ledger	5	2	20	1	2	0	9	14	11
Word processing	13	18	8	6	10	10	2	0	0
Communications	11	1	1	0	10	2	2	3	27
Integrated	8	1	0	3	1	0	7	3	19

Table A.16.

THE INFORMATION CENTER BROADENS THE END-USER BASE,
AND THE CONCENTRATION OF REQUESTS SHIFTS

(Table shows percentage-of-request distributions for both infocenter and non-infocenter companies)

	COMPANIES WITHOUT INFOCENTERS	COMPANIES WITH INFOCENTERS	DIFFERENCE
Senior managers	24	12	-12
Middle managers	19	28	+9
Supervisory managers	15	26	+11
Exempt, nonsupervisory	25	25	0
Nonexempt personnel	14	9	-5
No answer	2	0	0
Corporate	23	14	-9
Sales	7	14	+7
Finance	20	26	+6
MIS/DP	18	9	-9
Human resources	1	6	+5
Purchasing	2	3	+1
Administration	14	14	0
Office systems	7	7	0
Other	8	8	0

The percentage of requests shifts toward the middle levels of management and diversifies away from corporate and MIS.

Table A.17.

THE MIX OF INFOCENTER REQUESTS REMAINS STEADY, START-UP YEAR TO CURRENT YEAR

Most requests still come from middle managers.

	Current percentage	Change from year of start-up
Senior managers	12	-0.9
Middle managers	27.9	-1.5
Supervisory managers	25.8	+.9
Exempt, nonsupervisory	24.8	+1.6
Nonexempt	8.9	+.3

Requests from corporate and finance still top the others.

Corporate	14.9	-1.1
Sales	13.7	+3.5
Finance	25.9	-2.5
MIS/DP	9.1	-.5
Human resources	5.7	-.1
Purchasing	2.8	-.6
Administration	14.0	+.6
Office systems	6.6	-1.8
Other	8.0	-.2

Table A.18.

NUMBER OF PERSONAL COMPUTERS CURRENTLY ON PREMISES

(Percentage of respondents with 1 to 10 pc's, 11 to 25 pc's, and so forth)

		ANNUAL SALES							
Number of pc's	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	23.4	63.2	42.9	71.4	0.0	61.5	12.9	4.8	7.9
11-25	18.4	26.3	14.3	14.3	27.3	0.0	19.4	19.0	18.4
26-50	16.5	0.0	0.0	0.0	36.4	15.4	29.0	28.6	10.5
51-100	17.1	0.0	0.0	0.0	9.1	15.4	19.4	23.8	23.7
101-200	8.2	0.0	14.3	0.0	0.0	7.7	6.5	14.3	10.5
More than 200	8.2	0.0	14.3	0.0	9.1	0.0	6.5	4.8	21.1
None/no answer	8.2	10.5	14.3	14.3	18.2	0.0	6.5	4.8	7.9

Table A.19.

NUMBER OF END-USERS CURRENTLY SERVED BY STANDALONE PC'S

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	22.2	47.4	42.9	57.1	9.1	38.5	19.4	9.5	10.5
11-25	11.4	5.3	0.0	0.0	27.3	0.0	12.9	14.3	10.5
26-50	12.0	10.5	14.3	0.0	9.1	23.1	32.3	0.0	5.3
51-100	17.1	0.0	0.0	14.3	9.1	23.1	6.5	42.9	23.7
101-200	9.5	5.3	14.3	0.0	27.3	7.7	0.0	4.8	15.8
More than 200	10.8	0.0	14.3	0.0	0.0	0.0	12.9	14.3	21.1
None/no answer	17.1	31.6	14.3	28.6	18.2	7.7	16.1	14.3	13.2

Table A.20.

NUMBER OF END-USERS CURRENTLY SERVED BY MAINFRAME TERMINALS

(Percentage of respondents checking each of six number-of-user categories)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	10.8	26.3	0.0	0.0	0.0	7.7	16.1	9.5	5.3
11-25	8.2	21.1	0.0	0.0	9.1	0.0	9.7	9.5	5.3
26-50	13.9	10.5	57.1	57.1	9.1	23.1	9.7	9.5	7.9
51-100	15.8	5.3	28.6	14.3	18.2	38.5	12.9	19.0	13.2
101-200	9.5	5.3	0.0	0.0	27.3	15.4	9.7	9.5	5.3
More than 200	25.9	5.3	14.3	0.0	18.2	15.4	25.8	38.1	47.4
None/no answer	15.8	26.3	0.0	28.6	18.2	0.0	16.1	4.8	15.8

Table A.21.

NUMBER OF END-USERS CURRENTLY SERVED BY PC'S LINKED TO THE MAINFRAME

(Percentage of respondents checking each of six number-of-user categories)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	32.3	26.3	42.9	57.1	36.4	23.1	32.3	28.6	31.6
11-25	11.4	10.5	0.0	0.0	18.2	0.0	6.5	19.0	15.8
26-50	10.1	0.0	14.3	0.0	9.1	7.7	16.1	9.5	13.2
51-100	6.3	0.0	0.0	0.0	9.1	15.4	6.5	9.5	7.9
101-200	3.2	0.0	14.3	0.0	0.0	0.0	0.0	4.8	5.3
More than 200	1.3	0.0	14.3	0.0	0.0	0.0	0.0	0.0	2.6
None/no answer	38.4	63.2	14.3	42.9	27.3	53.8	38.7	28.6	23.7

Table A.22.

NUMBER OF PEOPLE CURRENTLY ASSIGNED TO INFOCENTER STAFF
AND ANTICIPATED 1985 INCREASE

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Current staff:									
Average number, full time	5.4	5.4	5.5	8.7	5.0	4.1	4.3	4.0	7.0
Average number, part time	1.9	2.6	0.0	2.0	1.0	1.4	1.6	1.4	2.4
Percentage of companies that will increase staff in 1985	39%	11%	29%	43%	46%	23%	45%	57%	47%
If company will increase staff, by how many?									
Average number, full-time	1.86	5.50	1.50	1.33	1.80	1.67	1.75	1.36	2.22
Average number, part-time	2.58	2.00	4.0	2.67	3.20	1.67	1.92	2.36	2.94

Table A.23.

SOME COMPANIES ARE MORE SUCCESSFUL THAN OTHERS IN LINKING PERSONAL COMPUTERS TO THE MAINFRAME

(Percentage of personal computers currently linked to the mainframe)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
None	20.9	42.1	0.0	28.6	18.2	46.2	22.6	4.8	15.8
1-10%	28.5	15.8	28.6	0.0	36.4	7.7	32.3	42.9	31.6
11-20%	10.8	10.5	0.0	0.0	9.1	7.7	9.7	9.5	15.8
21-30%	5.7	5.3	14.3	0.0	0.0	0.0	6.5	9.5	2.6
31-40%	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3
41-50%	9.5	10.5	0.0	14.3	9.1	15.4	6.5	9.5	10.5
51-60%	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
61-70%	1.3	0.0	0.0	0.0	0.0	0.0	3.2	0.0	2.6
71-80%	3.8	0.0	0.0	0.0	0.0	7.7	6.5	9.5	2.6
81-90%	2.5	0.0	0.0	14.3	0.0	0.0	3.2	4.8	2.6
91-100%	5.1	0.0	42.9	28.6	0.0	15.4	0.0	0.0	2.6
No answer	10.1	15.8	14.3	14.3	27.3	0.0	9.7	9.5	5.3
MEAN	24.1	12.2	55.5	55.2	12.0	31.4	20.5	25.7	23.6

Table A.24.

NUMBER OF PERSONAL COMPUTER END-USERS THE INFOCENTER EXPECTS TO SERVE BY THE END OF 1985

(Percentage of respondents checking each of six number-of-user categories)

		ANNUAL SALES							
Number	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	12.0	36.8	28.6	14.3	0.0	23.1	12.9	0.0	5.3
11-25	9.5	15.8	14.3	14.3	0.0	15.4	9.7	9.5	5.3
26-50	12.7	15.8	14.3	0.0	27.3	7.7	16.1	14.3	7.9
51-100	15.2	0.0	0.0	0.0	27.3	15.4	16.1	42.9	10.5
101-200	12.7	0.0	14.3	14.3	9.1	15.4	12.9	9.5	15.8
More than 200	19.0	0.0	14.3	0.0	18.2	0.0	16.1	14.3	42.1
None/no answer	19.0	31.6	14.3	57.1	18.2	23.1	16.1	9.5	13.2

Table A.25.

NUMBER OF MAINFRAME END-USERS THE INFOCENTER EXPECTS TO SERVE BY THE END OF 1985

(Percentage of respondents checking each of five number-of-user categories)

		ANNUAL SALES							
Number	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	9.5	36.8	0.0	0.0	0.0	7.7	9.7	0.0	5.3
11-25	7.0	15.8	14.3	0.0	9.1	0.0	3.2	19.0	0.0
26-50	11.4	10.5	57.1	28.6	9.1	15.4	16.1	0.0	5.3
51-100	17.1	10.5	14.3	28.6	9.1	38.5	19.4	19.0	13.2
101-200	12.7	0.0	0.0	0.0	45.5	23.1	12.9	14.3	10.5
More than 200	30.4	5.3	14.3	0.0	9.1	15.4	32.3	42.9	52.6
None/no answer	12.0	21.1	0.0	42.9	18.2	0.0	6.5	4.8	13.2

Table A.26.

NUMBER OF PC-LINKED-TO-MAINFRAME END-USERS INFOCENTER EXPECTS TO SERVE BY END OF 1985

(Again, the table shows percentage distributions among the number-of-end-user categories)

		ANNUAL SALES							
Number	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	22.2	31.6	28.6	14.3	18.2	53.8	25.8	9.5	13.2
11-25	16.5	10.5	14.3	14.3	18.2	15.4	12.9	23.8	21.1
26-50	15.8	0.0	14.3	0.0	9.1	15.4	22.6	19.0	21.1
51-100	8.9	0.0	14.3	0.0	18.2	0.0	12.9	9.5	7.9
101-200	3.8	0.0	14.3	0.0	0.0	0.0	3.2	9.5	5.3
More than 200	5.1	0.0	0.0	0.0	9.1	0.0	0.0	4.8	13.2
None/no answer	27.8	57.9	14.3	71.4	27.3	15.4	22.6	23.8	18.4

Table A.27.

THE LARGER THE COMPANY, THE HIGHER THE PERCENTAGE OF END-USERS THAT WILL UPGRADE HARDWARE IN 1985

(Respondents checked one of nine boxes to indicate the percentage of their end-users that would upgrade their hardware. Table shows percentage distribution.)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
None	8.2	10.5	28.6	28.6	18.2	7.7	6.5	4.8	2.6
1-10%	25.9	10.5	14.3	14.3	18.2	23.1	32.3	23.8	39.5
11-20%	21.5	21.1	0.0	14.3	18.2	30.8	29.0	28.6	15.8
21-30%	12.0	5.3	0.0	0.0	18.2	7.7	9.7	19.0	13.2
31-40%	3.8	10.5	0.0	0.0	0.0	0.0	3.2	0.0	5.3
41-50%	8.2	21.1	0.0	0.0	9.1	23.1	3.2	0.0	5.3
51-60%	1.9	0.0	14.3	0.0	0.0	0.0	3.2	4.8	0.0
61-70%	.6	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0
71-80%	.6	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
No answer	17.1	21.1	28.6	42.9	18.2	7.7	9.7	19.0	18.4

Table A.28.

IBM DOMINATES INFOCENTER PC HARDWARE

(Average percentages pc's on premises, by brand name)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Apple	4.6	1.4	0.8	0.0	1.3	15.9	9.9	1.8	2.3
Dec	2.5	7.1	6.7	2.8	0.0	1.5	.4	0.0	3.6
Hewlett-Packard	3.0	0.0	0.5	0.0	2.2	0.4	4.9	7.5	3.1
IBM	73.9	58.6	54.3	57.8	70.1	65.8	78.4	73.5	82.6
Tandy	1.0	6.4	4.2	0.0	0.0	0.0	0.0	0.4	0.5
Wang	1.5	0.0	16.7	0.0	4.4	1.5	0.4	0.5	0.9
Honeywell	1.3	0.0	0.0	0.0	0.1	0.0	0.0	4.5	2.5
All other	12.7	25.9	16.5	39.0	21.6	12.6	10.5	12.0	3.8

Table A.29.

EASE OF USE, VENDOR BACKUP, AND IBM COMPATIBILITY
ARE THE MOST IMPORTANT CRITERIA FOR EVALUATING HARDWARE

(Mean scores, five-point scale)

	HARDWARE	SOFTWARE
Ease of use	4.39	4.78
Ease of instruction	4.07	4.45
Tutorial mode	2.96	3.57
On-line help facility	3.13	3.73
Vendor back-up/support	4.23	3.97
Range of applications	3.86	3.63
Windowing capability	2.46	2.39
Mainframe compatibility	3.90	3.44
IBM compatibility	4.17	4.10
Cost	3.76	3.62
Volume discounts	3.43	3.05

Respondents again used the five-point scale to indicate the importance of each criterion.

Table A.30.

INFOCENTER MANAGERS SEE EASIER SOFTWARE INSTRUCTION
AND BETTER HARDWARE NETWORKING/DOWNLOADING
CAPABILITIES AS KEYS TO THEIR FUTURE

(Mean scores, five-point scale)

	HARDWARE	SOFTWARE
Easier instructional materials	3.77	4.39
Increased vendor support	3.73	3.73
Lower per unit cost	3.98	3.70
More reliable product information	3.79	3.94
Increased memory	3.72	2.99
Increased networking capability	3.99	3.63
Increased uploading/downloading capability	4.01	3.88
Increased upgrading capability	3.79	3.62

Respondents were asked to rate the importance of each item in terms of its importance to their units. Again, the higher the score, the greater the importance.

Table A.31.

HANDS-ON TESTING AND WORD-OF-MOUTH INFLUENCE THE SELECTION DECISION

(Mean scores, 5 point scale)

		ANNUAL SALES							
	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
Vendor material	3.86	4.24	3.80	3.50	3.33	3.69	4.04	4.00	3.69
Vendor representatives	3.08	3.25	2.33	3.83	2.67	3.31	3.32	2.90	2.89
Professional meetings	3.32	3.06	3.40	3.17	3.11	3.46	3.54	3.10	3.44
Computer shows	2.57	2.71	2.40	2.50	2.53	2.69	2.57	2.55	2.51
Trade publications:									
Editorial content	3.44	3.41	3.20	3.33	3.67	3.69	3.44	3.15	3.59
Advertising content	2.89	2.81	3.20	2.50	2.88	3.00	2.81	2.95	2.83
Mass market publications:									
Editorial content	2.62	2.38	2.60	2.67	2.63	2.85	2.56	2.37	2.78
Advertising content	2.29	2.06	2.20	2.00	2.25	2.38	2.36	2.21	2.23
Subscription rating services	2.78	2.19	3.50	5.00	2.75	2.83	2.65	2.44	3.00
Hands-on testing	4.43	4.33	4.00	4.83	4.80	4.15	4.36	4.20	4.68
Word of mouth	3.77	4.06	3.50	3.67	3.22	4.08	3.71	3.75	3.67
Other	2.75	5.00	3.00	0.0	0.0	0.0	1.67	0.0	3.00

Respondents rated the influence of 11 sources of information on their selection decisions. The higher the score on the five-point scale, the greater the importance.

Table A.32.

NUMBER OF PERSONAL COMPUTERS COMPANY WILL BUY IN 1985

(Percentage of respondents checking one-of-six quantity-of-purchase categories)

		ANNUAL SALES							
Number	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	28.5	52.6	57.1	28.6	36.4	38.5	25.8	14.3	13.2
11-25	19.6	10.5	0.0	28.6	9.1	38.5	32.3	23.8	13.2
26-50	21.5	5.3	0.0	0.0	36.4	15.4	22.6	28.6	28.9
51-100	7.6	0.0	14.3	0.0	0.0	7.7	9.7	14.3	10.5
101-200	7.6	0.0	0.0	0.0	9.1	0.0	6.5	14.3	10.5
More than 200	5.1	0.0	14.3	0.0	0.0	0.0	0.0	0.0	18.4
None/no answer	10.1	31.6	14.3	42.9	9.1	0.0	3.2	4.8	5.3

Table A.33.

NUMBER OF TERMINALS INFOCENTER COMPANIES WILL BUY IN 1985

(Percentage of repondents checking one of six quantity-of-purchase categories)

		ANNUAL SALES							
Number	TOTAL	UNDER $10 MILLION	$10 TO $25 MILLION	$25 TO $50 MILLION	$50 TO $100 MILLION	$100 TO $200 MILLION	$200 TO $500 MILLION	$500 MILLION TO $1 BILLION	MORE THAN $1 BILLION
1-10	26.6	47.4	28.6	57.1	27.3	23.1	25.8	14.3	18.4
11-25	12.0	5.3	28.6	14.3	9.1	23.1	16.1	19.0	5.3
26-50	17.7	5.3	0.0	0.0	9.1	53.8	25.8	9.5	15.8
51-100	14.6	5.3	14.3	0.0	27.3	0.0	16.1	19.0	23.7
101-200	7.6	0.0	0.0	0.0	9.1	0.0	6.5	19.0	10.5
More than 200	5.1	0.0	14.3	0.0	0.0	0.0	0.0	0.0	15.8
None/no answer	16.5	36.8	14.3	28.6	18.2	0.0	9.7	19.0	10.5

A comparison with the previous table reveals that larger organizations are stepping up their purchases of terminals, vis-a-vis pc's, during the remainder of 1985.

APPENDIX B: Explanation of Charts

This appendix presents the results of a two-page questionnaire distributed to individuals attending AMA seminars in our New York and San Francisco Centers for Management Development, as well as to managers attending AMA's Competency Development Laboratory.

We received approximately 1,100 responses. Of these, a total of 1,020 respondents answered the questions on whether or not their companies had information centers, and a total of 952 respondents returned questionnaires that were judged sufficiently complete for inclusion in the general tabulation and analysis.

The survey drew heavily from managers in staff positions, with respondents from finance and MIS/DP representing the two largest categories. The responses were evenly distributed across the various company size categories in the mid-size range, but with bulges (disproportionately more respondents) coming from the small (fewer than 500 employee) and large (more than 10,000 employee) categories.

Fuller commentary on the results can be found in Chapter 7.

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Table B.1. presents answers to the question of whether or not the respondent's company had an Infocenter. As noted earlier, the results are very much in line with research conducted by other organizations, small as the samples may have been in the prior research. The only discrepancy comes in comparing these results with the results from our own "long form" questionnaire. That instrument puts the percentage of small companies with InfoCenters at 22 percent as compared with the short form's 38 percent. (The two instruments produced highly compatible results for all other company-size cells.)

It's tempting to assert that the short questionnaire produced more creditable data. After all, the measurement came from 261 small (fewer than 500 employee) companies--a far larger sample. But what we may be seeing here is a bit of semantic slight of hand. Ask a group of employees from small companies whether or not their firms have Information Centers (as the 12-page questionnaire did), and 22 percent might well answer yes. Ask the same group, "Has your company centralized its personal computing assistance fuction in an Information Center or similar unit?" (the wording used in the two-page questionnaire), and 38 percent of the respondents might well answer yes. Yes, their organizations have centralized the process of selecting and purchasing pc's, and yes, someone is providing assistance.

Again, it's a bit like the woman who went to the conference to learn how to start an InfoCenter, and found that she already had one.

Table B.1.

HOW MANY COMPANIES HAVE INFORMATION CENTERS?

(Percentage distribution)

Size (Number of Employees)	Have a Center	No, But Plan To	No Center, No Plans
Fewer than 500	38	14	47
500-999	53	13	33
1,000-1,999	45	10	45
2,000-4,999	62	8	30
5,000-10,000	64	3	33
10,000 or more	66	11	23
All respondents	54	10	36

Table B.2.

MANAGERS HAVE ACCESS TO MORE THAN ONE PERSONAL COMPUTING TOOL

(Percentage distribution. Respondents could check more than one category.)

	Available, full time	Available, shared time
Standalone (unlinked) pc	40	30
PC, dial-up connection to mainframe	21	17
PC linked to mainframe	20	16
Terminal linked to main-frame or minicomputer	42	23

Respondents had, on average, 1.2 personal computing tools available on a full-time basis: a terminal and a standalone, for example.

Table B.3.

MOST MANAGERS HAVE BEEN USING THEIR COMPUTERS LESS THAN TWO YEARS

(Respondents checked one of three length-of-use categories. Table shows percentages.)

Less than one year	36
One to two years	35
Three years or longer	25
No answer	4

Table B.4.

THERE'S AT LEAST ONE HEAVY USER IN EVERY GROUP

(Respondents checked one of six boxes to indicate hours used per week. Table shows percentages distributed by functional categories.)

	Number	1 hr. or less	1-2 hrs.	3-5 hrs.	6-10 hrs.	11-20 hrs.	20+ hrs.
CEO	71	45	15	18	11	4	1
General management	33	30	18	27	18	3	3
Sales/marketing	90	39	18	17	16	4	3
Finance	212	25	12	20	18	16	9
MIS/DP	192	17	7	19	17	17	23
Staff (miscellaneous)	112	34	17	20	10	8	10
Human Resources	27	37	30	15	4	7	7
R&D	91	31	19	23	15	7	5
Purchasing	9	22	22	11	22	22	0
Manufacturing	51	37	14	20	14	6	6
Clerical	22	14	5	32	27	14	9
Other	13	23	14	9	23	14	14
All respondents excluding Finance, MIS, Clerical	497	36	18	19	13	6	6